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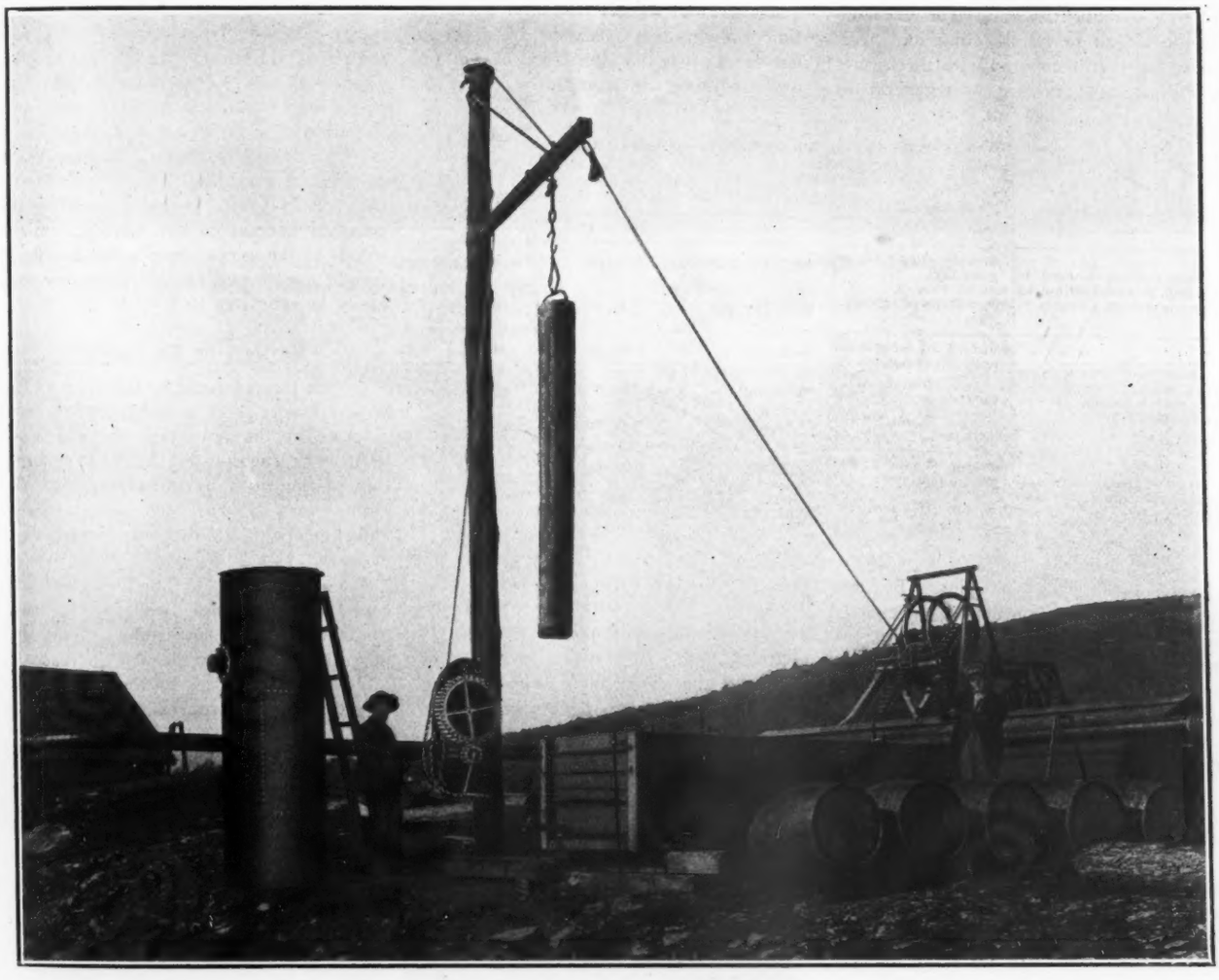
Preservation of Mine Timber from Decay

Experiments Conducted by Philadelphia & Reading C. & I. Co., and U. S. Forest Service Show How Life of Timber May Be Prolonged

BY JOHN M. NELSON*

Those who are interested in mining are well aware of the decreasing supply and increasing price of timber suitable for mining purposes. The time has come when every stick of timber used either inside or outside the mines should be so handled during its entire life that it may be expected to give its greatest service.

The Philadelphia & Reading Coal and Iron Company and the U. S. Forest Service, in February 1906, planned a series of experiments to be conducted along practical and economical lines with the primary idea of saving timber and money. Actual tests have been carried on to discover just what methods of handling and treatment would give the greatest service at the least expense.



SMALL EXPERIMENTAL TREATING PLANT FOR THE APPLICATION OF CREOSOTE BY THE OPEN-TANK METHOD WITHOUT PRESSURE. A SOLUTION OF ZINC CHLORIDE MAY ALSO BE APPLIED IN THIS PLANT

Destructive Agencies

The factors destructive to timber used by anthracite coal companies are (1) decay, (2) breakage, (3) wear, (4) insects, (5) waste. It is decay and the methods of preventing decay in which the Coal and Iron Company and the Forest Service have been more especially interested. It will hardly be profitable for mining companies to apply an expensive treatment to timber which will soon be broken by the crush and squeeze of coal and rock, or worn out by the rubbing of ropes and cables. However, with timber being destroyed either by decay or insects, a preservative treatment may result in an enormous saving to the mining company.

Timber for mining purposes has heretofore been rushed from the woods to the mines and placed in the mines in an ab-

Note—From a lecture delivered before the employees of the Philadelphia & Reading Coal and Iron Company.

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solutely green and unpeeled condition with the result that dry rot or decay causes rapid destruction. We believe by better methods of handling, such as peeling and seasoning and by a preservative treatment with oils or chemical salts, that the life of this timber would be prolonged and its general condition both to soundness and strength considerably improved.

Sets of round gangway timber, used in the main haulage ways, were tested as a basis for this experimental work, inasmuch as with this form of mine timber would be the greatest saving in expense providing preservative treatments were successful. The Pennsylvania pitch and the southern loblolly pines were the more important experimental timbers, as these species furnish the bulk of the round gangway timber 11 in. in diameter and over, used in the mines of the Philadelphia & Reading Coal and Iron Company. Every condition of handling and treatment has been compared with the form of gangway timber now in most general use,

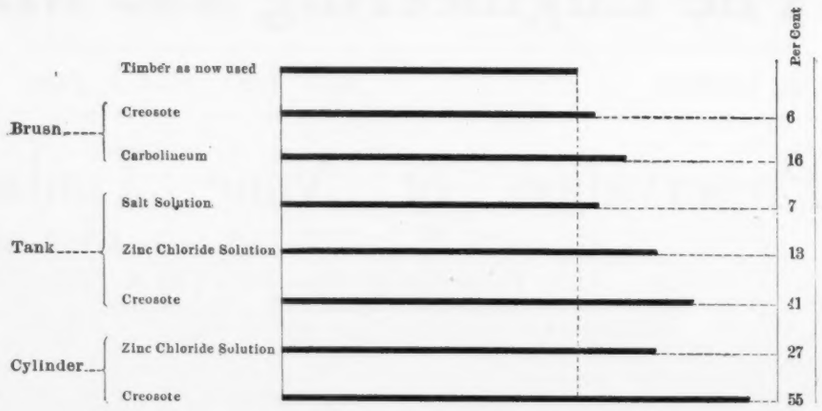


DIAGRAM SHOWING INCREASED LIFE NECESSARY TO PAY FOR THE COST OF PRESERVATIVE TREATMENTS

namely, green, unpeeled pine. By this comparison it was hoped to learn exactly to what extent the experimental timber would be benefited by various preservative treatments and by better methods of handling.

In the experimental work the following were the main points studied:

(1) The benefits of peeling timber.

(2) The benefit of seasoning timber or drying it out.

(3) The benefit of treating timber with various preservatives applied by several processes.

The preservative treatments tested and their relative costs are given in the accompanying table.

Although this experimental work has been in progress but a comparatively short time, some conclusive results and a great many indications have been obtained.

Factors That Cause Decay

Ventilation is a large factor in the destruction of timber by decay. In badly ventilated air courses, where there is sufficient moisture and temperature, decay is at a maximum. For wood-destroying organisms to exist, they must have air and water. If it were possible to keep the timber always wet or always dry, it would not decay; it is the alternation of wet and dry conditions which produces rot.

COST OF PRESERVATIVE TREATMENT OF TIMBER.

Method of Application.	Preservative.	Approximate Cost of Preservative.	Approximate Cost per Set of Gangway Timber of 26 Cu. Ft.	Cost Per Cu. Ft.
Preservative heated to 180 deg. F. and applied in two coats with a brush.	Creosote (Dead oil of coal tar).	$0.09 per gal.	$0.40	$0.01½
	Avernarius Carbolineum.	$0.70 per gal.	$1.15	$0.04½
Immersion in an open tank without pressure—successive baths of hot and cold fluid.	Solution of common salt, 15 per cent.	$0.09 per lb.	$0.50	$0.02
	Solution of zinc chloride, 6 per cent.	$0.04½ per lb.	$0.90	$0.03⅛
	Creosote (Dead oil of coal tar).	$0.09 per gal.	$2.85	$0.11
In a closed cylinder under vacuum and pressure.	Solution of zinc chloride, 6 per cent.	$0.04½ per lb.	$1.90	$0.07
	Creosote (Dead oil of coal tar).	$0.09 per gal.	$3.85	$0.15

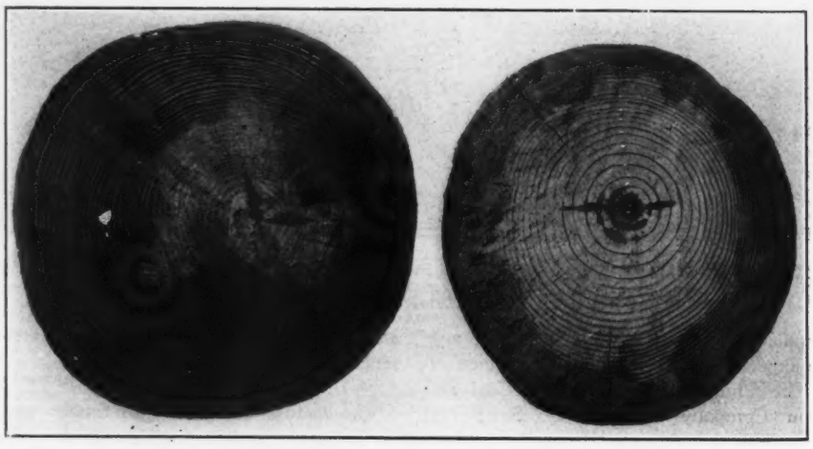
By direct experiment, it has been definitely proved that in durability, peeled timber is superior to unpeeled timber. In unpeeled timber the space between the bark and the wood favors the development of wood-destroying organisms and furnishes a breeding place for many forms of insect life. Peeled timber is 7 to 8 per cent. lighter than unpeeled timber.

Great benefits may be derived from seasoning the timber or drying it out. Seasoned timber is far more durable than green timber, and is considerably stronger. A period of from 2 to 5 months is necessary for proper seasoning. In that length of time, it may lose from 30 to 35 per cent. of its green weight. In case the company handles its own timber from the woods to the mines, the possible saving in freight due to peeling and seasoning may easily be estimated.

Methods of Treatment

Of the treated timbers, those preserved with creosote and a solution of zinc chloride by the open tank method, have been very successful. A good penetration of the wood by the preserving fluid from 2 to 5 in., has been easily secured, and timbers so treated effectively resist decay.

Timbers treated by the cylinder process are also standing well, but in order to be a profitable investment, they will have to show a considerable increase in life over those treated by the far less expensive open tank process.



SECTIONS FROM CENTER OF 10-FT. STICK TREATED WITH CREOSOTE BY THE OPEN-TANK PROCESS, SHOWING RELATIVE PENETRATION IN SEASONED AND IN GREEN TIMBER

The success of the superficial brush treatment has yet to be proved. Timber so treated is not as effectively resisting decay as the other treatments. On account of their comparative cheapness and ease of application, requiring no plant, they may be of benefit to small operators or in a situation where the timber is likely to be broken.

Time alone can prove which is the most efficient treatment for each and every condition that must be met in the mines. However, we know that we have some good treatments and that the preservation of mine timber has been successfully accomplished. Acting on the results obtained from this series of experiments, the Philadelphia & Reading Coal and Iron Company is considering the advisability of taking up treating work on a larger scale. Plans have been drawn for the construction and erection of an open tank treating plant at one of its collieries. If erected, either creosote or zinc chloride solution will be the preserving fluid used.

The successful application of a preservative treatment to mine timber is largely dependent upon the regulation of the timber supply of the consumer, and a timber supply that will admit of this regulation. Under these conditions, timber cannot be rushed from the woods into the mines. There must be time for treating it and for preparing it for treatment. This means the storage of a reserve supply of felled timber at one or more points.

It should be distinctly understood that this series of experiments especially applies to the southern anthracite coal region, where the Pennsylvania and southern pines are the leading mine timbers. To regions where conditions and species of timber differ, the results of these experiments may not be applicable.

According to A. Schwartz and W. H. N. James (*Electrician*, 1906, LVI, 468-469) fuses of aluminum wire, particularly of small diameter, are unreliable owing to the molten metal being held up by the skin of oxide which forms on the surface. The metal attains a dull red heat just before fusion, and on disruption will throw off burning globules of metal a distance of several feet even on a low-tension circuit. Aluminum, zinc and cadmium, being highly electro-positive to copper and brass, are liable to considerable corrosion of the contacts when used in damp situations. Consequently their application is somewhat limited.

DESTRUCTION OF LOBLOLLY PINE GANGWAY TIMBERS BY INSECTS

A result of not peeling timber, accumulation of borings (sawdust) on the floor.

RESULT OF PARTIAL BRUSH TREATMENT WITH CARBOLINEUM

The divison between treated and untreated portions is well defined. The untreated part shows the mycelium of a wood-destroying fungus.

TWO SETS OF GANGWAY LOGS CREOSOTED BY OPEN TANK

As a result of the treatment, these sets show a sound condition around the notches of joints of logs and collars where decay is most prevalent.

POLYPORUS ANNOSUS

The chief wood-destroying fungus of pine. The cause of decay.

Italians as Mine Workers

By Robert B. Brinsmade*

My experience while in charge of an Eastern iron mine may be of interest to those who have to do with Italian employees. At the time of my arrival in mid-winter, half the underground muckers were Italians. Several of the race had aspired to run rock drills, but their attempts had met with indifferent success, and the Austrian drill runners did not do well with Italian novices as helpers.

In winter a large number of Italians are idle; the contracts and construction work on which they are employed in warm weather are suspended, and rather than face the cold of the northern woods they usually prefer to hibernate among their compatriots in some large town. The warm, even temperature underground delighted them at first, but their sensitiveness to cold led to a desertion *en masse*, when called to the surface one arctic night to help put back a derailed skip.

However, it was quite another racial trait that finally settled their fate underground. An American miner had the misfortune to be killed by a fall of ground. When the mine was ready to resume after the accident, no Italians were to be found. The absent ones were finally located in a mining camp some miles away, and even then it was only their fear of the padrone that finally made them return to work. Even underground heat seemed to have lost its charm. Timid and superstitious by nature, in spite of their bloodthirsty vendettas, the accident had opened their eyes to the possible dangers of their unaccustomed surroundings.

Even before the accidents, Italians going to work underground for the first time would sometimes throw down their shovels after a few minutes and go up. I heard one of these deserters rejoicing on his departure for the railroad, that he had escaped alive from "that frightful hole."

After the accident, even the influence of the padrone was unavailing to dispel the terrors of the mine darkness. Some of the muckers took 10-hour surface jobs in preference to the eight-hour work underground; others, less industrious and hardy, returned to their winter loafing quarters in the city.

Efficient Surface Laborers

An efficient gang of Italian dock men was obtained by weeding out the small percentage of lazy and incompetent among new arrivals. As ore sorters, the Americans were preferable, but as shovelers the Italians worked well during the day; many were so enthusiastic that they often toiled half the night in addition if given a favorable contract to unload coal or do special grading. The majority were from the coast of Campania, and of small size, but some from the hill country of southern Italy were as large as Teutons.

Their language was a peasant *patois*, so different from literary Italian as to be almost a different tongue. Though the majority were illiterate peasants, one was a blacksmith, who had wandered extensively in South America, another was the son of a mine boss, in Italy, and had some education. In spite of their clannishness, the facility with which they acquire a smattering of English makes them easier to handle than the slower Slavic races.

During a short strike, they acted inoffensively, but their small respect for the sacredness of an obligation was illustrated when they failed to return to work at the time agreed upon.

The theft of coal from our cars was also a common occurrence in winter, and might have risen from the fact that they mistook American liberty for license. Beer was their favorite beverage, being cheaper than their accustomed wine, but few were drunkards, as the Latin races generally are more temperate than their neighbors to the north and east. They took few lay-offs outside of the legal American rest days; for this reason alone, they would be chosen instead of their Slavic competitors whose numerous holidays render them unavailable.

The custom of ticketing Italian laborers with brass checks in order to handle them on the pay-roll by number is a curious one, and is a reflection on the linguistic ability of the average paymaster, as well as a hindrance to the development of American individuality. The Italians themselves do not seem to object, and often call newcomers by number in preference to name; perhaps in Italy the substitution of a number for a man's name does not have a penitentiary flavor, as in this country.

In spite of their faults, Italians can be made very useful as surface workers around mines. In time they might even become good miners, judging by the underground skill of an occasional one, if caught young and properly trained.

*Mining engineer, Lawrence, Kan.

Slum Ponds of the Washoe Smelting Works

The fine material not retained in the classifiers and settling tanks of the Washoe Smelting Works, described in a pamphlet prepared by members of the Anaconda Copper Mining Company, is carried by the water to "slum ponds." situated in the valley below the works. There are six ponds of different sizes, averaging about 300x630 ft. When a pond is full, the water is diverted to an empty pond, and as much water drained off as possible. The pond is then excavated by one of two Lidgerwood traveling cableways, each having a bucket capacity of 5 tons. The slum is piled outside of the pond and allowed to drain and dry, and from these piles it is taken by cableway and dropped into a hopper on trucks, from which it runs into the railroad cars beneath and is taken to storage bins for use at the briquet plant. The slime water containing the least values is used for condensing purposes and for sluicing slag at the reverberatories and blast furnaces.

The settling tanks containing fine and second settlement concentrates are emptied from the bottom, after draining, into cars and transported to the charge floor of the calcine building, the material being weighed and sampled before dumping.

Tamarack Mining Company

The report of the Tamarack Mining Company, Houghton county, Michigan, for the year ending Dec. 31, 1906, contains the following statement of operations for the year:

	Total.	Cents. per lb.
Sale of 9,832,644 lb. copper	$1,853,455	18.86
Miscellaneous income	63,777	0.55
Total receipts	$1,917,232	19.40
Construction expenses	$ 90,517	0.92
Running expenses at mine	1,255,579	12.77
Smelting, transportation charges, etc.	157,505	1.60
Total cost of refined copper	$1,503,601	15 29
Surplus	$ 413,631	
Deduct two dividends	300,000	
Surplus	$ 113,631	
Balance Dec. 31, 1905	848,589	
Balance Dec. 31, 1906	$ 962,220	

The copper content of the Tamarack rock and cost of mining and milling is shown for the years 1905 and 1906:

	1905.	1906.
Tons of rock stamped	750,120	389,680
Mineral obtained	24,780,945	14,779,890
Percentage refined copper in mineral	63.855	66.53
Refined copper per ton of rock lb.	21.1	25.2
Product, fine copper lb.	15,824,008	9,832,644
Cost of mining per ton of rock	$2.1683	$2.926
Cost of stamping per ton of rock	0.2217	0.294

Underground development for the year consisted of shaft sinking, 90 ft.; drifting, 2598 ft.; crosscuts, 860 ft.; sinking winzes, 1083 ft.; total openings, 4632 ft.

The fire which started on Jan. 11, 1906, curtailed operations and reduced the output by nearly one-half and necessitated many hundred feet of re-timbering in the shafts. The total expense directly attributable to the fire was $112,805 for the year.

No. 2 mill was completed by the addition of a new stamp-mill and an additional set of 16x36-in. recrushing rolls with the usual concentrating machinery.

It is the intention of the management to continue changing the single-expansion stamp-mills into compound expansion as rapidly as conditions permit.

The Panasqueira Tungsten District, Portugal

By Wilhelm Preus*

Among the most important tungsten mines on the Iberian peninsula are the Panasqueira mines in the province of Beira Baixa, Portugal. They are divided into the Panasqueira group and the Cabeco Piao group, shown in the accompanying map. These two groups comprise about 1000 hectares of steeply sloping country, showing signs of existing mineral deposits, as outcrops and float.

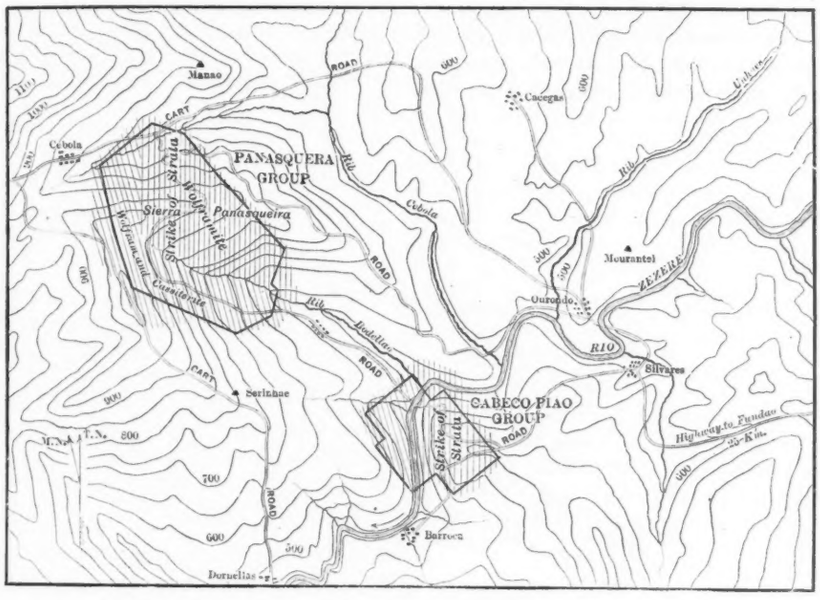
The ore deposits consist of quartz beds, varying from 0.10 m. to 0.60 m. in thickness, containing the minerals wolframite, cassiterite, oxide of iron, iron pyrites, mispickel and mica. There are numerous beds situated in Cambrian schist.

In the southern part of the Panasqueira group and the western part of the Cabeco Piao group the strata strike magnetic north. Here the beds contain wolframite, cassiterite, oxide of iron, mica, a small amount of carbonate of copper and iron and arsenical pyrites.

The deposits are well defined, both walls being sharp limits of the quartz. The beds in the Panasqueira group are almost horizontal, dipping 5 to 10 deg. to the South; in the Cabeco Piao group they dip 35 deg. to the North.

Faults

There is more or less faulting, the faults being almost vertical, and mostly striking north and south or east and west; they are 0.10m. to 1m. wide, are composed of crushed shale, and are very permeable by water. The faults are generally compensating and the displacement very slight, being nil in the Cabeco Piao group, and two to three meters in the Panasqueira group.



TOPOGRAPHY OF THE PANASQUEIRA TUNGSTEN DISTRICT, PORTUGAL

Location

The mines are situated almost in the center of a large sedimentary bed about 11 km. from the nearest igneous rocks. This I think noteworthy, as most tungsten deposits in Spain and Portugal are either within igneous rocks, especially granite, or on the contact of igneous and sedimentary rocks. The strata vary in direction from true north to south to magnetic north to south (16 deg. west—true north.) This fact suggests some influence upon the mineral concentration or deposition of the beds. Those in the schists with strike true north contain wolframite, oxide of iron, pyrites, mispickel, little mica, but no cassiterite or carbonate of copper. The northern part of the Panasqueira group and the eastern part of the Cabeco Piao group have beds of this sort.

The mineralization is rather erratic and although faults appear to have had some influence, this is difficult to determine. Nevertheless it has been noted that when three or four faults cross each other forming a triangle or a trapezoid the part of the bed limited by the faults as a rule is richer than other parts of the same bed. A bed recently opened yielded 110 kg. tungsten concentrates per square meter from a space within three faults, and several lumps of pure mineral weighing 30 to 100 kg. were found; another bed found within triangular faults yielded about 90 kg. tungsten per square meter. Such cases frequently occur.

Panasqueira Group

Exploitation has been going on for about 10 years in the Panasqueira group on the north slope of the Panasqueira Sierra, where an incomplete concentration plant has been put up. There are 15 proved quartz beds on the north slope and corresponding beds have been found on the south slope. Only four of these have been exploited to any extent. The proprietors of the mines have in 10 years exploited, concentrated and sold 600 metric tons of tungsten concentrate (68 to 71 per cent. WO_3) which cost, including freight to Fundao, about $130, Portuguese currency, per ton. The prices obtained during the last three years have varied between $5.25 and $10 per unit ($365 to $700 per ton) c.i.f. Continental ports.

About 30,000 sq.m. of quartz beds have been stoped out during these 10 years, yielding 25,000 tons of ore for treatment at the plant. The mill has been slightly improved but about 25 per cent. of the wolframite is still lost in the dumps; the mines are at present producing at the rate of 200 to 250 tons of concentrates (68 to 71 per cent. WO_3) per year.

The Cabeco Piao Group

In the Cabeco Piao group exploration has proved the existence of 10 beds, and in four of these about 60,000 sq.m. of quartz beds have been laid bare with very little work; these will average 25 kg. of wolframite (68 to 71 per cent. WO_3) per square meter. Simultaneously some development was done and during two years about 50 tons of wolframite were sold. This ore was obtained with a very incomplete manual washing plant.

In the district containing cassiterite only exploration work has been done.

It appears that these mines would be capable of producing 1500 to 2000 tons of wolframite per year at a cost of $80 to $100 per ton, and at this rate they would be able to dictate the European price; but to do this a rational development of the mines and the installation of a modern and effective concentrating plant would be necessary, which is not likely to take place.

Livache and Potain have made a series of experiments on the substitution of zinc white for white lead both as paint, and as a priming composition for porous surfaces. For a satisfactory paint, zinc white requires one-fifth more oil than white lead, but will then cover one-fifth more surface, and by adding to the oil 1 per cent. of manganese resinate and a sufficiency of oil of turpentine, zinc white paint will dry in practically the same time as white lead. As a priming composition, a mixture of 1000 parts of zinc white, 1500 of whiting, and 633 of linseed oil containing 2—4 per cent. of manganese resinate is equal, both as regards applicability and rapidity of drying, to one consisting of equal parts of white lead and whiting, while costing only about 10 per cent. more.

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A Curious Deposit of Cerussite in Colorado

The Ore in the Terrible Mine, at Ilse, Custer County, is Not Associated with Sulphides and Other Minerals Usually Found with Lead

BY ROBERT B. BRINSMADE*

In the Terrible mine, at Ilse, Custer county, Colorado, there is an unusual deposit of cerussite. First discovered about 1880, it has passed through varying fortunes. At present it lies idle. During its working life the mine produced some 250,000 tons of ore from which over $500,000 worth of lead concentrate was extracted and shipped. A few tons of ore were rich enough to sort and smelt direct, but the greater part was handled as concentrate with 60 to 70 per cent. lead.

Peculiar Method of Manufacturing Litharge

The old concentrator had crushers, sizers, jigs and tables like the orthodox arrangement for galena, but the process of making litharge, adopted by the Crystal Lead Company, the last operators, to utilize the rare nature of cerussite concentrate, is worthy of note. The litharge furnace was a small brick reverberatory. By raising the concentrate to a heat sufficient to free the CO_2, the PbO dropped through the perforated iron grate of the hearth, leaving only a cinder of silica fused with a small percentage of PbO. The furnace had a capacity of 6 tons per day. By grinding the furnace product in an Abbé tube mill and then bolting through a 200-mesh silk screen the litharge became ready for shipment in 150-lb. canvas sacks.

A ton of concentrate averaged a yield of 1500 lb. of litharge containing 90 per cent. PbO, the balance being silica. In spite of the impurity, this litharge was superior to the usual kind for use in vulcanizing rubber, owing to its freedom from shots of metallic lead.

The Mine

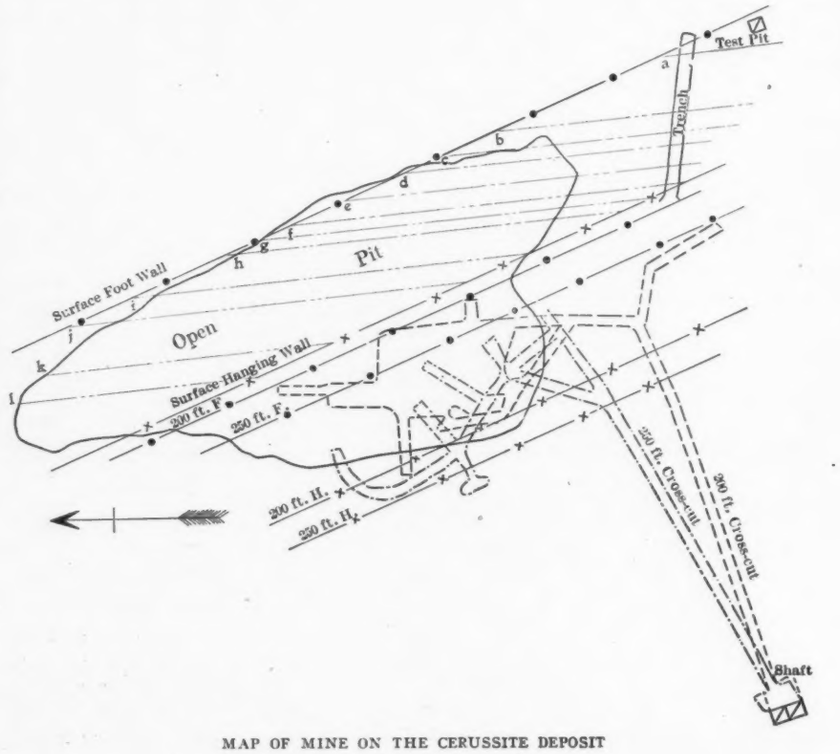
The mine lies in Oak Creek valley in the Greenhorn mountains, 25 miles south of Florence, Colorado. The valley, for the 20 miles of its length observed, was apparently eroded in metamorphic schists along the axis of an ancient anticlinal fold. Ascending the creek from the Arkansas valley through a rugged cañon till within 10 miles of the mine, when the bounding hills take a gentler slope that is covered with soil and brush, it exhibits only occasional outcrops of the schist. Here, too, the creek bottom becomes broad enough to permit of considerable agriculture.

The old mine now has the appearance of an open quarry, about 450 ft. long by 100 ft. wide, filled with water to within 50 ft. of the surface. The local theories of the deposit were either that it was an impregnated igneous dike or a great fissure vein in gneiss. On first sight the iron-stained, decomposed and shattered mineralized material that shows around the pit sides may have been either a dike or a vein, and it required close study to find evidence that these theories were untenable.

Features of the Deposit

The striking feature of the east side of the quarry is the hanging wall, a parting plane on a dip of 67 deg., which is well marked and doubtless first gave rise to the vein theory. This parting plane, however, is filled with a layer of finely divided blue clay 6 to 12 in. thick, which indicates a fault of considerable movement. How far this fault extended horizontally, it is not possible to trace, without trenching, as the valley soil covers the fault outcrop to a depth of several feet. Three miles south along the valley, at Leadhills, was found, some 20 years ago, a pocket of a cerussite in similar rock and 80 tons of concentrate from a hand jig was shipped; but there is little or no showing in the old pits there at present, and no evidence of the hanging wall fault was seen.

The foot-wall faulting, on the contrary, is less well defined and the line by which it is marked on the map indicates a series of irregular slips marking the eastern boundary of the ore. Between foot and hanging there is no porphyry or true-vein matter visible in the deposit, but only metamorphic strata with bedding planes at the surface, represented by *a, b, c* on the map, parallel to the strike of the surrounding country rock. These strata are alternate layers of granulite (quartz and orthoclase) and gneiss (mica, quartz and plagioclase felspar), in which weathering and movement has obscured, in many cases, the original bedding planes.



MAP OF MINE ON THE CERUSSITE DEPOSIT

The strata of the profitable ore extend between bedding planes and are practically all granulite, forming a solid mineralized block, thrown into this position by the hanging- and foot-wall faulting, and having gneiss for both walls. Just beyond the thick gneiss strata, north and south of *b* and *l*, are more granulite layers containing cerussite, but not found in sufficient quantity for mining.

*Mining engineer, Lawrence, Kan.

Nature of the Rocks

The granulite is a hard, brittle rock and when shattered by earth movements the resultant cracks appear to have remained open until filled by solutions. The gneiss, on the contrary, is more decomposed and so soft that small cracks could be easily closed by slight pressure. It is therefore not surprising to find the cerussite confined to the cracks of the granulite, while the gneiss is practically barren.

The cerussite layers are usually 1/16 to ⅛ in. thick and the proportion of ore depends upon their number. In some places the granulite averages 10 per cent. lead, but the general average as mined yielded 4 to 5 per cent. of metallic lead in the mill. Occasionally the cerussite has formed considerable masses. One weighing 115 lb. was exhibited at the Portland Fair. These masses are crystalline druses, appearing casually like white, opaque vein quartz, and only shown the crystal habit along occasional planes on their periphery. The cerussite is dull white, translucent, brittle and easily detachable in small plates from its rock matrix. It is free from metallic impurities and is easily distinguishable from calcite in its thin sheets by giving no effervescence with dilute HCl.

Genesis of the Deposit

There is little doubt that the ore is of secondary origin, for primary lead ore habitually comes up in the form of sulphides. It is true that at Steamboat Springs, Nevada, the minerals deposited by the rising hot water contain a small proportion of cerussite, but it is only in association with ten times as much galena, and at the Terrible no galena has ever been detected.

It therefore appears probable that this deposit has been formed by descending waters. The clay selvage in the fault would stop the lead-bearing waters from penetrating further west and the fault would thus be the hanging wall; while the foot-wall boundary was caused by minor slips, more or less parallel with the hanging wall, shutting off the open cracks of the gneiss and forming a dam on the east side that prevented any considerable penetration of the cerussite into the foot-wall.

There are two possible sources of the lead: beds in limestone or small veins in the schists. No limestone was observed in the vicinity, but small galena veins are found in schists on the hillsides within a mile of the Terrible, and a sufficient number of them in the eroded anticlinal arch could have furnished all the lead in the mine.

With the help of heat and oxidation the two simplest equations for changing PbS to $PbCO_3$ are:

I. $PbS + 4O = PbSO_4$.

II. $PbSO_4 + Ca(HCO_3)_2 = PbCO_3 + H_2CO_3 + CaSO_4$.

Sufficient lime for the reaction in the absence of adjoining bedded limestone could easily have come from the lime felspars of the gneiss. The solutions may have entered the cracked granulite as $PbCO_3$ dissolved in the hot H_2CO_3, and the $PbCO_3$ may have been crystallized out by the cooling of the carrying solution.

In view of the fact that the granulite cracks north and south of the orebody contain calcite instead of cerussite, another method of ore origin is tenable. The lead may have entered the cracks as $PbSCO_4$ dissolved in hot H_2SO_4 and replaced the previously deposted calcite by the reaction of equation II. But this would set free considerable $CaSO_4$ within the orebody, and as no gypsum is to be observed in the pit, this theory of cerussite deposition seems less likely than the first.

It is probable from the method of origin that the ore does not reach a great depth. The rock cracks would tend to close up as depth was gained from the rising pressure, and they would also be smaller as the stress, and consequently also the shattering, is greatest at the top of the anticlinal arch. In the lowest workings on the 250-ft. level the cracks were smaller than at the surface, which seems to corroborate this theory.

Sampling Ores Containing Metallics

F. A. Thompson, *Western Chemist and Metallurgist,* Vol. III, has submitted the results of sampling an ore, containing metallics, not to show the proper method of sampling, but to show the difficulties attending the operation. The ore was porphyritic, the feldspar being pretty well kaolinized and in places was heavily iron stained. The gold and silver was present almost entirely as metallics, flakes of gold being visible to the naked eye; sometimes pieces of gold as large as grains of rice were visible.

The whole lot weighing about 10 tons was crushed to 0.5 in. size, and 1/5 cut out with a Vezin sampler. This two-ton cut was roll-crushed to about 0.12 in., and carefully riffled twice on a Jones sampler, having riffles 1 in. wide. This 500 lb. sample was put through smaller rolls to about 0.06-in. size and cut once with the riffle sampler. Each half was treated separately, being called original and duplicate, by cutting once with the riffler and rolled to about 0.025 in. size, and again cut to about 10 pounds.

The 10-lb. sample was passed through a coffee mill grinder several times, and riffled down to approximately 2 lb. and sifted on a 100-mesh sieve, about 90 per cent. passing through without further grinding. The oversize was bucked on a board until the metallics, which often showed up as ribbons of gold on the board, passed through the sieve. The pulp was mixed, coned and quartered, and divided into samples for the mine and sampler.

Results of the Assay

Sample	*Oz. gold per ton*
Sampler Original	9.29
Mine Original	11.22
Sampler Duplicate	12.60
Mine Duplicate	13.74
Average	11.71

The results on each sample being the average of at least four assays of ½ assay ton each, which upon the sample differed at times as much as 0.5 oz., it was decided to resample as the differences evidently lay there. The resample was started with the 1/5 portion of the original sampling, and the operation from that point to the division into original and duplicate repeated with more care if possible than at first. The sample now instead of being divided into two parts was divided into four and each part treated separately and reduced as before. The four final portions were ground in the coffee mill and the pulp weighed before screening. The metallics were then sifted out on a 100-mesh sieve, wrapped in lead foil and assayed, two by the mine and two by the sampler, each accepting the other's results. The through-screen portion was divided up into samples for the mine, sampler and umpire:

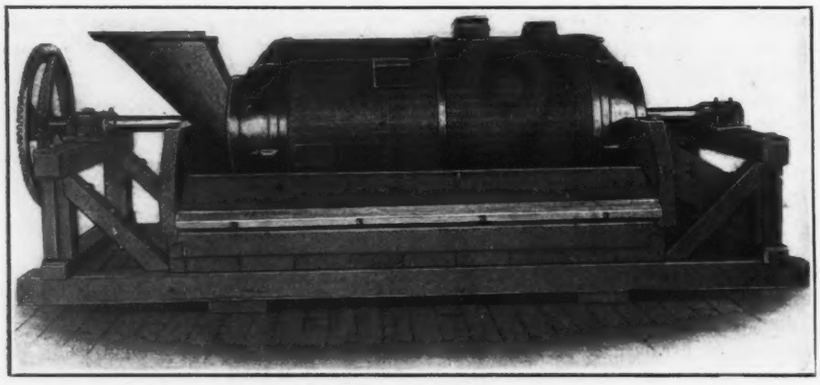
Result of Second Assay, Oz. Gold per Ton

	Pulp			Metallics		Final
	Mine	*Sampler*	*Average.*	*Mine*	*Sampler*	Results
First original	10.23	10.00	10.11		2.23	12.34
First duplicate	15.88	14.36	15.12	3.20		18.32
Second original	16.80	14.24	15.52		7.04	22.56
Second duplicate	16.90	15.23	16.07	2.39		18.46
Average						17.92

The settlement was made on this basis, and the experiment stopped. In the first sampling it is evident that metallics remained on the bucking board and muller, but in either case the results are not conclusive, and it is a question whether an accurate sample can be obtained on such material. The ratio of weight of sample to size of particles is well within the limits prescribed by sampling authorities.

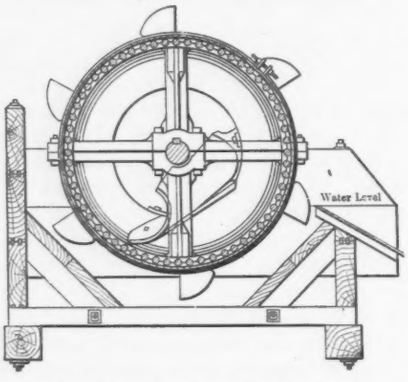
New Century Disintegrating Screen

The New Century Disintegrating screen, manufactured by the American Concentrator Company, Joplin, Mo., is a washing and disintegrating machine for the preliminary treatment of ore, barytes or other substances imbedded in stiff clay, mud or soapstone. It is a cylindrical screen protected within by round iron bars, and provided with a series of elevator buckets on the outside, the whole revolving in a tank of water.



NEW CENTURY DISINTEGRATING SCREEN

The material, which may include lumps of ore or boulders 10 in. in diameter, is fed into the revolving cylinder through a cast-iron hopper and is separated and washed by the action of the iron bars and the water. The bars are separated by one-inch spaces. The material which passes this revolving grizzly falls upon the screen and if sufficiently fine passes into the tank whence it is elevated by the buckets and discharged upon an apron and thence by launders to any desired point.



CROSS SECTION OF SCREEN AND TANK

The coarse material, after being rolled over and over in the machine, is discharged by means of a suitable casting.

The screen and revolving grizzly are supported by heavy spiders constructed in two parts so that they may be replaced without disturbing the central shaft. The machine is driven by countershaft and pinion with either bevel or spur gear, placed as desired.

The machine is furnished in different sizes and with screen perforations varying from 50 mesh to 1½-in. holes. The water required varies with the material treated; usually a 1½- to 2-in. pipe under a 3-ft. head furnishes an ample supply.

In the Bluefields gold district in Central America machines of this type are used having screens as fine as 60-mesh, while for washing carbonate zinc ores in Tennessee 1½-in. perforations are used. At the works of the American Sapphire Company, in Montana, the holes vary from 3/16 to 5/8 inch.

California and Nevada Mining Wages

SPECIAL CORRESPONDENCE

Fifty members of the senior class of the College of Mines, University of California, have gone to visit the mines at Tonopah, Nevada. Field surveying and examination of prominent mines will comprise the work of the trip. It is notable that a large number of University men are now scattered throughout the newer mining camps of southern Nevada. There are representatives of Yale, Harvard, Stanford, California, Pennsylvania, Princeton, Michigan, Northwestern, Chicago, Virginia, Cornell, Georgetown, Brown, Oxford and Heidelberg, in the city of Reno alone, and they are about to form the Nevada University Club with headquarters in that city, where a club house will be built. These graduates have been attracted to Nevada by the opportunities to make money in mining and other occupations.

In this connection it may be said that numbers of practical miners are leaving the mines of California for the better wages offered in the Nevada camps. For this reason there is a shortage of miners in most of the California mining countries. In one of the San Francisco dailies of April 3 there are advertisements for miners to work in California, among them one which calls for 82 machine men at $3.50 to $4 per day; 36 single and double hand drillers $67.50 to $90 per month; 26 muckers $75 to $80 per month; 60 carmen, $60 to $75 per month; 168 drillers for mines and quarries $67.50 to $90 per month. This gives a fair idea of the California wages. The underground miners get $3 to $5 per day according to the section of the State, the former price being the general average. In Nevada wages are much higher, being nearer $4.50 per day on the average and this accounts for so many leaving for that State.

Navigation and Mining in California

SPECIAL CORRESPONDENCE

The California Débris Commission has made a report which may be summarized as follows:

1. That it is advisable to attempt to divert the Bear or American rivers into the tule lands.

2. That it is inadvisable to construct settling basins and restraining barriers in the lower courses of the Bear and American rivers.

3. That it is now time to commence the work of restoring the navigable conditions of 1860 in the Sacramento and Feather rivers.

4. That the most feasible and advantageous method of accomplishing this is by dredging.

In pursuance with these conclusions, and in compliance with the requirements of the Act of March 1, 1893, the commission recommends as follows:

1. That an appropriation of $400,000 be made by Congress contingent upon a similar appropriation being made by the State of California, part of this sum to be devoted to the construction of two hydraulic dredges of high power, and the remainder to their operation and maintenance, in accordance with the general terms of the report on improvement of navigation of the Sacramento and Feather rivers, and for disposing of the mining débris brought into those streams by their tributaries.

2. That these funds be expended by the California Débris Commission under the direction of the Secretary of War, all rights of way and easements for levees and spill banks to be furnished free of cost to the United States.

The River Improvement and Drainage Association of California, which organization has been working for the betterment and improvement of the conditions of the rivers of California has done much to bring about harmony in the interests of the various industries involved in the question of hydraulic mining.

Sloss-Sheffield Steel and Iron Company

This company owns extensive coal and iron-ore properties in Alabama, besides several blast furnaces and other manufacturing plants. The report is for the year ended Nov. 30, 1906. The capital account shows $6,700,000 preferred stock, $10,000,000 common stock, and $4,000,000 mortgage bonds.

The income account for the year is as follows, comparisons being made with the pervious year:

	1905.	1906.	Changes.
Sales and earnings	$5,747,075	$6,290,014	I. $542,939
Working and gen. expenses	4,181,838	4,938,268	I. 756,430
Net earnings	$1,565,237	$1,351,746	D. $213,491
Interest	$ 210,000	$ 210,000	.....
Depreciation	150,157	140,902	D. $ 9,255
Total charges	$ 360,157	$ 350,902	D. $ 9,255
Surplus	$1,205,080	$1,000,844	D. $204,236

From this surplus in 1906 dividends were paid of $469,000, or 7 per cent., on preferred stock, and of $500,000, or 5 per cent., on common stock; leaving a balance of $31,844.

From President J. C. Maben's remarks the following extracts are taken: "During last year the price of No. 2 iron at Birmingham advanced from $13.50 in June and July to $15.50 by September, which price continued to be maintained for deliveries during the first half of 1907, and in December the price was further advanced to $19 for deliveries during the third and fourth quarters of 1907, while iron for prompt delivery brought from $3 to $4 per ton more.

"Alabama did not share proportionately in the great increase in the production of iron, having produced only about 70,000 tons more than in 1905, when a strike of the miners at the coal mines of all the furnace companies but one in the Birmingham district more seriously interfered with the operation of the furnaces than during last year. The failure of Alabama to show a proportionate increase in production must be attributed somewhat to the scarcity of labor, but more largely to the failure of some of the railroads to handle the raw material for the furnaces. The labor situation was somewhat improved during the year, but some of the roads seemed less able to handle their business than during the previous year, and our furnaces were frequently banked for from a few hours to a day for the want of coke, when train loads of it were standing on sidings within a few hours' run of the furnaces, which, despite every effort, it seemed impossible to get placed in time. This, of course, decreased our output of iron, added to the cost, and produced bad working of the furnaces. . . .

"The furnaces of the company produced 31,000 tons less iron than in 1905, while the output of coal fell off 90,000 tons, and that of coke 20,000 tons, which must be attributed entirely to the causes before enumerated. The profits of the year were further curtailed by the failure to secure cars for the shipment of pig iron, which forced us to carry over into the present year a large tonnage. Altogether, last year was a most trying one in many ways, certainly for those in the iron and steel business in the South. . . .

"The working capital shows a decrease of a little over $200,000, which must be accounted for by the large amounts spent during the year in opening new coal and ore mines, improving furnaces, providing additional equipment in the way of steam shovels, dinkey locomotives and large side-dump tram cars for the brown-ore mines at Russellville and paying for the one-third interest in the North Alabama Furnace Company. During the year the company bought the one-third interest owned by outside parties in the North Alabama Furnace Company, including the bonds, so that it now owns all of the bonds and the entire capital stock of that company."

Frank J. Hearne

Frank J. Hearne, who was selected by the Gould-Rockefeller interests about three years ago to effect the financial rehabilitation of the Colorado Fuel and Iron Company, and whose death was announced in the JOURNAL a few weeks ago, was a descendant of William Hearne, who settled in Maryland in 1688. He was born in Cambridge, Maryland, September 21, 1846, received his early education in the academy at that place, and graduated from the Rensselaer Polytechnic Institute at Troy, New York, at the head of his class of engineers in 1867. Until 1872 he served as assistant engineer of the Hannibal & Saint Joe Railroad, when yielding to the solicitation of his father, William J. Hearne, he left the railroad to become assistant manager of the Riverside Iron Company's plant.

His remarkable executive ability was soon recognized by his associates and, having become thoroughly familiar with all the details of the business, he was promoted in 1875, when but 29 years old, to the position of general manager.

Riverside stock was then selling at about 70. Mr. Hearne put in a quarter of a century of active work in the management of the company, and when, in 1899, it was absorbed by the National Tube Company its stock was selling for 216⅔. Mr. Hearne became first vice-president of the National Tube Company and later president. When the National Tube Company became a constituent part of the United States Steel Corporation, he retired from active business with a fortune of several million dollars.

In 1903, however, when George J. Gould and John D. Rockefeller secured control of the Colorado Fuel and Iron Company, Mr. Hearne yielded to the solicitations of these gentlemen, made on the suggestion of H. C. Frick, to assume the management of the Colorado corporation with almost unlimited powers. Indeed, the powers of a resident viceroy were necessary to carry out successfully the difficult task. Under his efficient guidance the company has been put on a sound financial and economic basis. He developed the company's resources for raw materials and put the mines in such shape that the present visible ore supply will be sufficient for the company until 1940 or longer.

Coming as the successor to a group of exceptionally popular men, Mr. Hearne's position at first was far from easy. Nevertheless, by his tact and charming personality, he soon gained an enviable position in the social life of Denver. His thorough knowledge of every detail of the fuel and iron business, his abounding common sense, and his absolute fairness, won the respect and admiration of employees and associates. It was his liberal policy and his quiet masterfulness that preserved the cordial relations between the company and the people of Colorado and made an enduring reputation for him as one of the industrial giants of the West.

FRANK J. HEARNE

G. I. Petrenko *(Zeit anorg. Chem.*, 1906, XLVIII, 347-363) reports conclusive evidence of the existence of four alloys of silver and zinc; these correspond to the formulas Ag_3Zn_2, AgZn, Ag_2Zn_3, Ag_2Zn_5. In the same journal, pp. 319-346, R. Vogel states that gold forms three chemical compounds with zinc, corresponding to AuZn, Au_3Zn_5, and $AuZn_8$; and two with cadmium, represented by Au_4Cd_5, and $AuCd_3$.

The Manufacture of Nitrates from Air *

By Alfred J. Lotka†

At the inauguration of the new Institute for Technical Chemistry of the Technische Hochschule at Berlin, Prof. O.N. Witt delivered an address, dealing chiefly with the utilization of atmospheric nitrogen. He described, more particularly, Birkeland and Eyde's process for the manufacture of nitric acid and nitrates.

Principles of the Process

This process is based on the observation that the electric-disk discharge, produced by establishing an electric arc in a strong magnetic field, possesses to a peculiarly high degree the power of causing the combination of a mixture of oxygen and nitrogen. Such a disk-flame, fed by an alternating current, is inclosed within a flat furnace, built of refractory clay with a copper mantle, a vigorous current of air being maintained through it. The furnace is placed between the poles of a powerful direct-current electromagnet; the copper electrodes are so close together that, but for the diffusing action of the magnetic field, they would be short-circuited. These electrodes are hollow and water-cooled; owing to this precaution, they have a long life. The furnaces are used at the present on a practical scale at Notodden, Norway; they consume under normal conditions 500 kw. (at 5000 volts); but this figure has occasionally been raised to 700 kw. without injury.

The immense disk of flame in these furnaces is over 6½ ft. in diameter, and probably represents the most extended electric discharge ever maintained for any considerable time.

Norway has peculiarly favorable conditions for the development of industries depending on water power. Careful examination has shown that the water falls (with an aggregate capacity of about 350,000 h.p.) controlled by the company which is exploiting the Birkeland and Eyde process, can furnish electric energy at a cost of about $3 per h.p. year. The yield of nitric acid obtained regularly hitherto has been about 500-600 kg. of HNO_3 per kw.

Condensing the Gases

The gases issuing from the furnace contain only about 2 per cent. of nitric oxide. First of all they are cooled, the heat being utilized for concentrating the nitrate lyes finally obtained. The cooled gases are then passed through reaction towers lined with acid-proof slabs. Here the combination of nitric oxide with the excess of oxygen is carried to its limit.

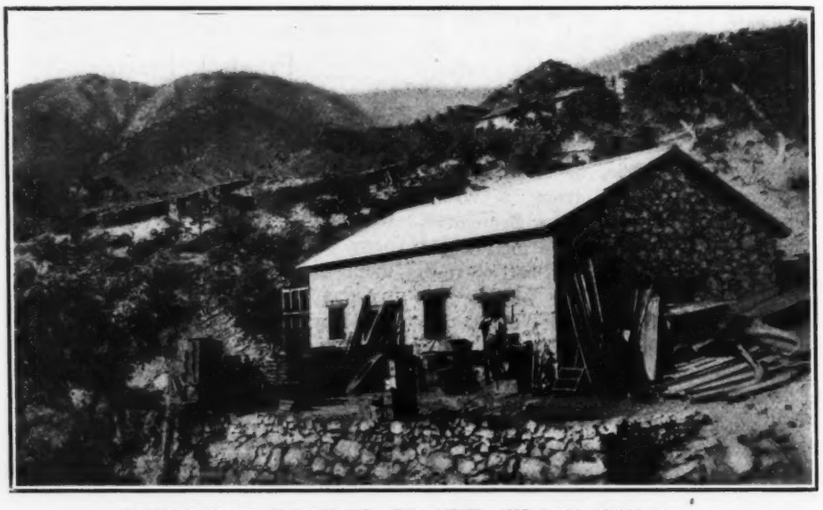
The gases next enter granite absorbing towers filled with quartz, over which water is kept trickling from above. The nitric acid flowing out at the bottom is returned to the top, being circulated in this way until it reaches a concentration of 50 per cent. The residual gas, too dilute in oxides of nitrogen for further absorption by water, is passed through towers fed with milk of lime, and through a chamber packed with solid lime. The calcium nitrite thus obtained is subsequently treated with nitric acid, to obtain calcium nitrate solution and to liberate nitrous vapors. The latter are returned to the granite absorption towers.

By-products

At Notodden the dilute nitric acid obtained is converted into calcium nitrate by neutralizing with limestone. The solution so obtained is united with that from the lime towers, and evaporated, the fused calcium nitrate being allowed to solidify in iron drums.

The plant at Notodden makes about 1500 kg. (3300 lb.) nitric acid in the form of nitrate, per day. Calcium nitrate promises to be in demand as raw material for various chemical processes. It is considered to be an excellent fertilizer, its freedom from sodium and chlorine giving it an advantage over Chile saltpeter.

*Abstract from *Chem. Ind.*, 1905, p. 695.
†Chemist, General Chemical Works, Laurel Hill, N. Y.



DOLORES MINE, WAREHOUSE FOR MINE AND MILL SUPPLIES

Genesis of Graphite

Two theories as to the formation of graphite deposits are discussed in the *Bull. Imp. Inst.*, Vol. IV, No. 4, 1906. In some cases it is thought to be formed by the action of intense heat on coal or other carbonaceous material, such heat being the result of the presence of igneous intrusive rock in the immediate neighborhood. Graphite formed in this way is compact, being the so called amorphous graphite, and includes the dull and earthy varieties and certain special forms which present a close resemblance to anthracite. Deposits of graphite formed by this contact metamorphism are those in the Alps in northern Italy, in the Caucasus in India, in Queensland, New South Wales, the eastern township of Quebec, in Rhode Island in the United States, Sonora in Mexico, and in Brazil.

The more usual mode of occurrence of graphite is as a secondary mineral, deposited in pre-existent rock by gaseous emanations from the interior of the earth, usually following on the intrusion of igneous dikes. Deposits of this character may occur as local impregnations of the rock or as stockwerks. Typical deposits formed in this way are those of Cumberland, Bavaria, Bohemia, Ceylon, and southern India. The secondary deposits have been ascribed to the alteration in place of veins or other fillings of solid or semi-solid hydrocarbons, such as asphalt, or to the decomposition of the vapors of acetylene or other volatile hydrocarbons. However, Weinschenk believes that the carbon forming the graphite was deposited from emanations containing carbonic oxide of the metallic carbonyls, especially those of iron and manganese, the oxides of which are often found in decomposed rock associated with deposits of graphite. He also thinks that cyanogen compounds may have played some part in the formation of a few graphite deposits.

Graphite of secondary origin may be either flaky, prismatic, fibrous or compact in structure. The coarser forms of graphite occur where the deposits have not been disturbed by earth movement. Although the secondary graphite deposits are usually of better quality, the irregularity of their mode of occurrence renders systematic mining of them well nigh impossible.

In view of the present dissatisfaction among Nebraska coal dealers over short weight, a bill is to be introduced to the State legislature, compelling the railroads to install track scales along their lines for the purpose of making weights on demand and compelling them to give destination weights.

The Dolores Mine, Chihuahua, Mexico

By John B. Farish*

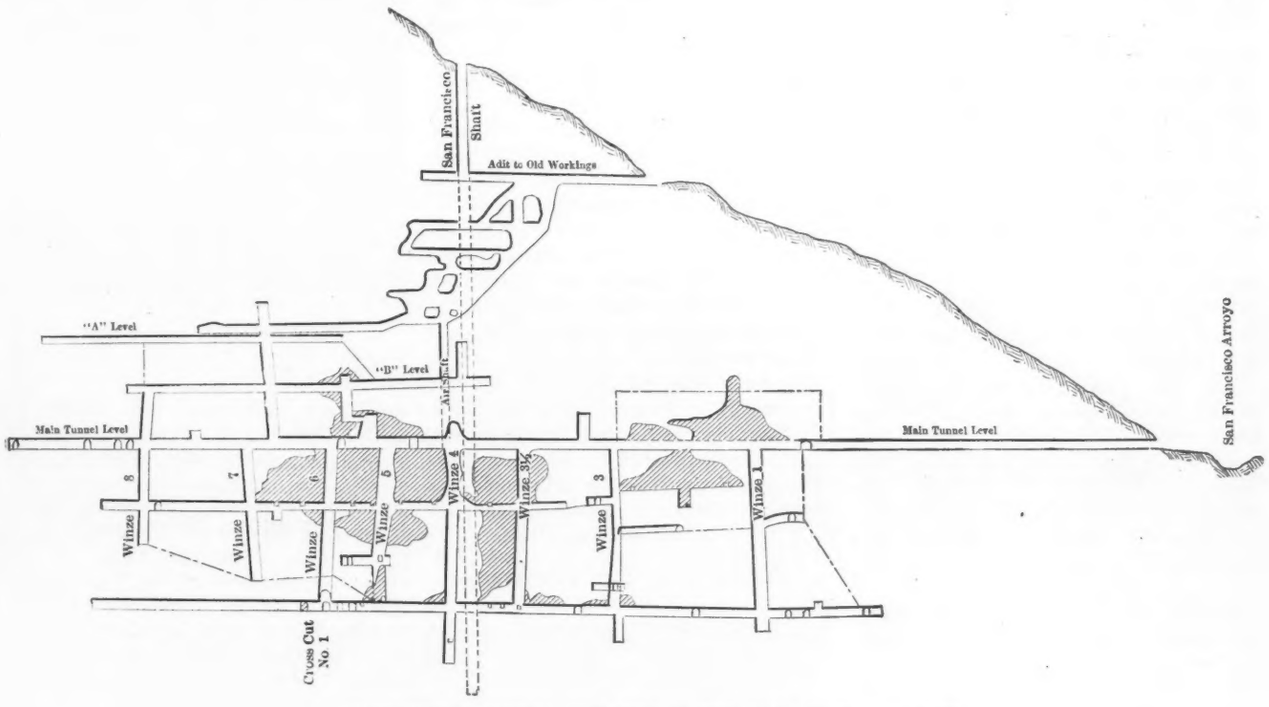
The country rock of the Dolores district is diabase. This is cut by dikes, more or less silicified. They have approximately an east and west course, the outcroppings of which form a prominent feature of the landscape. Accompanying the dikes at a greater or less distance—often in connection with and generally parallel to them—are zones of shearing of greater or less magnitude, the mineralization of which constitutes the veins of the district. Considerable leaching has taken place, and the outcroppings of the zones show a reddish coloration. Small bodies of ore were mined from a number of places on the surface 20 years ago. The largest of these old workings are on the Alma de Maria vein. So far as is now known the ore taken out by them was not very high grade, nor do the workings indicate that the bodies were important, facts probably due to the surface oxidation and leaching, which appears to extend in some instances to depths of over 400 ft. The only mine in which developments have extended below this level is the Alma de Maria, which has been opened in the zone of enrichment lying below the zone of oxidation.

Note—From a report made to the Dolores Mines Company, as the result of a visit to the property in June and July, 1906.

*Consulting mining engineer, Denver and New York.

Veins and Development

Alma de Maria—The Alma de Maria vein, upon which are the principal workings of the Dolores company, is a zone of shearing such as has been described. It extends in a generally north-northwest and south-southeast direction, and its cropping is easily traced for a distance of over a mile. Considerable leaching action has taken place on the surface, and to a depth of from 200 to 400 ft. Below this occurs the rich body of ore first encountered in the San Francisco tunnel. The main shoot, as developed, has a length of about 600 ft. The accompanying map shows a longitudinal section of the workings on the Alma de Maria vein.



LONGITUDINAL SECTION, WORKINGS OF THE ALMA DE MARIA MINE

San Francisco—Besides the Alma de Maria, there are other shear zones and dikes. One of the most prominent of these is the San Francisco. This vein is cut in the Alma de Maria crosscut tunnel where it shows a considerable width of oxidized and leached material.

Barron—Another prominent shear zone is that on which the Barron tunnel has been driven for a distance of 325 ft. in a northwesterly direction, and from which a crosscut driven 100 ft. to the west has probably cut one of the dikes that show on the surface.

Other Prospects—Another very important dike is the Macho dike, which extends for a long distance and is especially prominent in the San Luis Gonzaga claim. Other dikes and shear zones appear, but nothing of importance has been done upon them.

Character and Treatment of the Ore

The ore is a high-grade gold and silver ore, containing its value at the present market price of the latter metal (65c. per oz.) in the ratio of 40.6 per cent. in gold to 59.4 per cent. in silver.

During the administration of the old company it was the habit carefully to sort out and ship the high-grade ore, the lower grade being left upon the dump. Amalgamation served its purpose well. Five stamps of the mill were started on May 5, 1905. The yield from this part of the operations cannot but be satisfactory to any person acquainted with mining. However, it is probable that this part of the process will be superseded by concentration; for the ores now being amalgamated can be as well treated by that process and the tailings cyanided, as by the present one, and the concentrates will furnish the back freight desired. The cyanidation of the ore proved the success anticipated. I do not know of any place where as high an extraction of the silver is made as at Dolores.

Amalgamated zinc has generally been considered applicable only to the reduction of sulphuric-acid solutions of iron for its determination by permanganate. D. L. Randall has found (*Zeit. anorg. Chem.*, 1906, XLVII, 389-392) that it can be applied equally well to ferric chloride, provided that the titration is carried out in presence of manganous sulphate and with sufficiently dilute solutions. Under these conditions, excess of hydrochloric acid is no disadvantage; thus 25 c.c. of the acid may be present if the solution of about 0.5 gram of iron be diluted to 1 liter.

The Ferrocyanide Method for the Determination of Zinc

The conflicting opinions of various authorities led by W. H. Seaman (*Journ.* Am. Chem. Soc., XXXIX, pp. 205-211) to study the conditions influencing the determination of zinc by the ferrocyanide method. In agreement with Waring[1] and Miller and Hall[2] he found that a large excess of hydrochloric acid increases the consumption of ferrocyanide. The excess permissible was found to be from 1 to 10 c.c. in a bulk of 150 c.c. of solution. Undecomposed chlorates as well as bromine also increased the ferrocyanide used which confirms the statements of Waring[1] and Low[3].

The use of ammonium chloride is not harmful in the titration, and, in fact, aids the operation by settling the precipitate and sharpening the end reaction. Iron, copper, cadmium and manganese all affect the determination as has long been known. Aluminum did not affect the determination and here the author's work is in conflict with Waring[1], Miller & Hall and Low, who all claim that aluminum salts produce incorrect results.

In the effect of lead, which the writer finds to consume ferrocyanide and therefore objects to its use in removing copper when present, he has the support of Low,[3] who, however, objects to its use because the lead sometimes fails to remove all of the copper and affects the acidity of the solution. Furman[4] and Waring[1] both use test-lead to remove copper from the solution and Waring emphatically states that lead salts do not affect the titration.

Metallic zinc and zinc oxide were used for standardizing the ferrocyanide and it was found that the value of the solution varied with the amount of zinc taken and the author recommends the use of a table of factors. H. Nissenson and W. Ketteinbeil[5] in their report to the International Congress of Applied Chemistry as well as other writers do not mention this fact.

The method outlined by the author is as follows: Cover 5 grams of the ore, in a No. 3 casserole with 7 c.c. concentrated nitric acid, after which add an equal amount of hydrochloric; allow these acids to act for 15 minutes at a temperature not exceeding 60 deg., after which add 7 grams of ammonium chloride and evaporate to dryness on a hot plate. Remove from this hot plate, make alkaline with ammonia water (5 c.c. is enough), add 15 c.c. of bromine water and boil for three minutes. Filter, while hot, through a 11 c.m. filter paper, into a 400 c.c. breaker. Wash carefully three times with a hot solution of ammonium chloride and dilute ammonia. Make the filtrate weakly acid with dilute hydrochloric; place a piece of aluminum foil in the beaker, cover with a watch glass and boil for about three minutes, when all the copper, lead and cadmium will be precipitated. Remove the foil, wash it off and heat to boiling for titration. It is unnecessary to remove the precipitated metals, as their presence does not affect the results.

In titrating the operator should use a constant bulk, which may be 150 or 200 c.c. as he elects. Add 5 c.c. strong hydrochloric acid and titrate according to the method given by Low, starting the titration at a temperature of about 85 deg. and completing it before the temperature falls to 40 degrees.

To standardize: Weigh out into casseroles 0.05, 0.1, 0.15 and 0.2 gram of the oxide and treat precisely as an ore, omitting only the bromine treatment, the aluminum foil and the filtration. Run ore blank assay to determine the amount of ferrocyanide required to produce the coloration of the indicator or to the depth selected by the operator and deduct this from all burette readings. Use the factor nearest corresponding to the percentage of zinc in the ore.

Up to 1 gram of potassium chlorate may be used to decompose sulphides without disturbing the results; if more is used, Low's directions must be followed. Hydrogen peroxide may be substituted for the bromine water to remove manganese.

[1] *Journ.* Am. Chem. Soc., XXVI, pp. 4, 29.
[2] *Col. Sch. Mines Quart.*, 21, p. 270.
[3] A. H. Low, *Technical Methods of Analysis*, pp. 209, 222.
[4] Furman, *A Manual of Practical Assaying.*
[5] Nissenson & Kettembeil, *Chem. Zeit.*, LXXIII, pp. 951-955; E. M. J., LXXX, pp. 970-972.

Asbestos in the Transvaal

By J. Hartley Knight*

Several years have elapsed since the Transvaal Asbestos Syndicate was formed, but it was not until lately that the Anglo-Swiss Asbestos Company succeeded in proving that the Carolina district contains quantities of this mineral in a form which may be turned to profit. The part of Carolina which is apparently richest in asbestos deposits is located about 50 miles to the southeast of Machadadorp station, on the railway line running between Delagoa bay and Pretoria. On one farm alone, Goedverwacht, there is believed to be 200,000 tons of asbestos, a large part of it of good quality.

Half a dozen different syndicates are now actively at work in the Transvaal, and in a month or so one of them confidently expects to be in a position to ship regular monthly supplies of fine white asbestos to Europe and America. There seems to be no doubt about the quality of the mineral. The formations of serpentine containing asbestos are said to occur with great regularity, the formations frequently being more than 4 ft. thick, and invariably dipping about 5 deg. to the northwest. Deep shafting is not required; the deposits will be worked by adits running into the sides of the hills, and it is not anticipated that there will be any trouble in regard to water. For the most part, haulage will occasion no difficulty as the asbestos will be tipped down the sides of the hills.

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Batopilas Mining Company

The report of the Batopilas Mining Company, Chihuahua, Mexico, for the year 1906 shows an extraction of 1182 tons of first-class, 140 tons second-class, and 40,477 tons of third-class ore, the last averaging 8.145 oz. silver per ton. There were 25,472 ft. of mine workings. The treasurer's report is given partly in Mexican and partly in United States currency, but the latter only is given herewith:

FINANCIAL STATEMENT FOR 1906.

Gross earnings	$782,972
Interest, store, rents, etc.	35,202
Total income	$818,174
Taxes and bullion expense	$44,310
Operating expenses	406,697
Depreciation, interest, repairs, New York office, etc.	52,829
Total expenses	$503,836
Balance Dec. 31, 1906	$314,338
Balance previous year	355,801
Total surplus	$670,139
Adjustments	6,437
Carried forward	$663,702

Piping in Steel Ingots

A paper prepared for the American Institute of Mining Engineers by Prof. H. M. Howe, of Columbia University, New York, on "Piping and Segregation in Steel Ingots," and presented at the New York meeting, is published in full in the March *Bulletin* of the society. Through a printer's error one of Mr. Howe's most important contentions has been made unintelligible. In dealing with "Check Drillings," on page 270, the sentence printed below should have added to it the words in italics, which are omitted in the text as published: "Drillings from each such place shall be analyzed separately, and all the steel of the heat from which said drillings have come shall be rejected in case either the carbon or the phosphorus in said drillings exceeds *by one-third* the limit prescribed for carbon and phosphorus respectively for the ladle test, or in case the sulphur in said drillings exceeds *by two-thirds* the limit for sulphur set for the ladle test."

The recent Sunday labor law which has been passed in France restricts all work to six days in the week and imposes a Sunday holiday whenever possible. Among workmen paid by the hour the law is not favored.

Barytes Mines of the Commercial Mining and Milling Company

By Chas. A. Weller*

The barytes mines of the Commercial Mining and Milling Company, in Cocke county, Tenn., are well up in the mountains, and just beyond the last limestone formation before reaching the North Carolina line, where a granite formation is encountered. The property consists of about 1500 acres lying along the Southern Railroad and the French Broad river about 10 or 12 miles from the North Carolina line. The mineral appears in the mountains about 800 to 1000 ft. above the water of the river, and occurs in a well defined vein, which can be traced through the property for a distance of about three miles.

OPEN CUT MINE NO. 2

The outcrop shows a series of small veins from 18 in. to 2 ft., all taking the same general dip. At a depth of 150 ft. these veins have concentrated into one vein of about 7 ft. between walls which are well defined the hanging wall being a quartzite, and the foot wall a species of sandstone, partially decomposed, carrying with it more or less pyrites, which shows a trace of nickel. There are three openings, or tunnels, designated as Nos. 1, 2, and 3. No. 2 has been worked the most extensively and has a stope of about 150 ft. The mineral is highly crystalline and runs about 99.16 per cent. pure sulphate of barium. Some of the mineral is almost transparent.

LOADING BARYTES, MINE NO. 1, COMMERCIAL MINING AND MILLING COMPANY

*Knoxville, Tenn.

Development Work in the Slocan, British Columbia

Special Correspondence

Mining on what is now known as the Rambler-Cariboo group, situated in McGuigan basin, Slocan district of British Columbia, has been carried on under various ownerships, over a period of about 14 years. The group has been owned since the spring of 1899 by the Rambler-Cariboo Mines, Ltd., a company capitalized at $1,750,000, and having its head office at Kaslo, British Columbia. The total value of ore taken from this property is about $1,200,000. There has been practically no production for the past three years, for during this period important development has been in progress with the object of making the ore in the lower levels accessible at a much lower cost for delivery at surface than was practicable under the conditions prevailing when this work was undertaken.

The present manager, W. E. Zwicky, took charge of the mine in 1902. After a thorough study of the known orebodies in the mine, from which up to that time silver-lead ore having a gross value of about $800,000 had been mined, he concluded that they continue down to a considerable depth. The manager's recommendations were adopted, and the old method of working abandoned. The new plan involved the driving of a cross-cut tunnel between 4000 and 5000 ft., with the object of cutting the vein at a depth of about 1400 ft., or 600 ft. below the bottom level of the old workings.

Work on the deep-level tunnel was commenced on July 9, 1904. By May, 1906, a distance of 4600 ft. had been driven, the dimensions of the tunnel being 9 ft. 6 in. high by 7 ft. wide (7 ft. 6 in. by 7 ft. in the clear). Several small stringers of ore were cut but not the main vein, so as funds were getting low a raise was commenced. At 150 ft. up it entered the vein, giving a depth of 450 ft. below the old bottom level and 1250 ft. from the surface. Thence up to the old 800-ft. level the raise was made large enough for later use as a 3-compartment main working shaft, 12 ft. by 4 ft. 6 in. in the clear.

Early in March of this year it was calculated that the top of the raise was about 18 ft. from the bottom of the old workings, so a drill hole was put up and at 17 ft. it tapped the water. Once tapped, the water took eleven days to run off. It is estimated that it would have cost fully $10,000 to have pumped the mine out.

By March 20 the raise was completed through to the old workings; and now preparations are being made for a resumption of production. Already some ore has been taken out, and as soon as the road down to the railway shall be in good condition for hauling, shipment to the smelter will again take place.

The successful completion of this enterprise, which was the most important mining development ever undertaken in the Slocan district, is a matter for much satisfaction to all concerned. The significance of the success attained in this instance will be better appreciated when it is borne in mind that by drifting farther into the mountain, which rises high above the collar of the old shaft, it will be practicable to gain a depth of 2500 ft., or twice that at which the raise from the deep-level tunnel entered the vein.

Machine drills were used in the work, operated with compressed air from a Canadian Rand Drill Company's 14x22-in. D1 air compressor, belt-driven by a 3 ft. 6 in. Pelton wheel running under a head of 759 ft., or a pressure of about 325 lb. to the sq.in. The rock formation of the district is slate, through which a great boss of granite has been forced up, the whole being much cut by porphyry dikes. A well defined quartz vein cuts through both slate and granite, and across the contact, and has been traced on the surface for a long distance, in a northeast by north direction, with a dip to the south or into the mountain.

According to the report of the Government mining engineer, for the year ending June 30, 1906, the ratio of whites employed on the Witwatersrand mines to natives and Chinese was 1:7.82. The ratio for the previous year was 1:8.57. The average monthly wage of natives was 51s. 11d., housing and food costing 7s. The average wage of Chinese was 39s. 9d., feeding, etc., costing 11s. 7d. The salaries of whites amounted to £1,078,087, and the wages of whites to £5,807,274.

Mines and Minerals in the Philippines

Under American Rule the Industry Promises to Flourish in the Islands. The Deposits are Rich and Conditions are Not Unfavorable

BY THORNTON CHASE*

Prior to American occupation, the vast mineral resources of the Philippine islands were little known. Imperfect records in the obscure archives of the Spanish bureau of mines furnished but little information, none of which could be used as accurate data for either scientific or economic purposes. Many of the richest deposits were in regions inhabited by natives so hostile that a Spaniard raely dared show himself among them. Spanish sovereignty, toward the close of the last century, extended, in reality, no farther than the Spanish outposts, and for this power to foster and encourage the necessary exploration and development was beyond all possibility. Under the influence of the vigorous pioneer spirit that Americans have transplanted in the islands, the locality of various deposits has been accurately determined, and many claims have been located under the new mining laws. Some of these claims are being worked industriously.

Coal

First in importance, from an economical viewpoint, is the coal. Paleozoic coal has never been found in the islands, but its place is taken by a brown lignite, resembling that found in Washington. It occurs in large quantities in southern Luzon and the southern islands. In Cagayan province, near Calbong bay, outcroppings of lignite are plentiful; and near Aringay, in Union province, and in the Rio Malanas valley, in Abra, the seams are from 3 to 7 ft. thick.

In Rizal province, at Tataurian, and in the province of Camarines Sur, near Casaco, the outcroppings, while not so promising, disclose a finer quality of fuel. Fourteen miles south of Catanduanes lie the islands of Rapurapu, Batan and Carraray, upon which a black lignite of excellent quality and equal to the best Japanese coal, is found close to tidewater. The seams here vary from 4 to 8 m. in thickness and are easily accessible to the coasting steamers.

In Negros island the outcroppings are traceable for nearly 30 miles parallel to, and 6 miles from the southwestern coast. Speaking generally, the lignite fields extend from Abra province, in Luzon, southeast throughout the group. Sorsogon, Cebu and Albay provinces, because of their natural advantages, will become the first extensive sources of the coal supply of the islands. During the last decade, the island steamers have drawn considerable of their supply from the Compostela group of mines in Cebu, and a smelting work at this place was long contemplated by the company holding the concession. The Compostela seams are 8 ft. and more in width, and should be able to compete successfully with Japanese and other foreign coal in the Manila market. Labor is cheap, and energy and method are all that is required.

The existence of unexplored coal beds in the great island of Mindanao, and in the neighboring island of Leyte, has been proved, but little else is known regarding them.

The coal deposits of the islands offer great opportunities for investment and will be operated upon an extensive scale as soon as the necessary capital can be interested. The new railroads which are at present under construction in Panay, Negros and Luzon, will lend an impetus to their development, offering, not only a means of transportation, but also an inexhaustible market near at hand.

Iron Mines

The Filipinos are indebted to the Chinese for their early knowledge of iron-working, and at Angat, in the mountains to the eastward of the great plains of Luzon, there are numerous iron mines that have been in existence for centuries. Through these mountains extends a belt of magnetite, 40 miles in length, whose ores carry from 65 to 70 per cent. of iron.

All the iron mines in this district, which are at present producing, lie in the range forming the western boundary of La Infanta. On the Malaquit river in the province of Camarines Norte there is an extensive deposit of magnetite which is being worked by the natives. The ore is treated in a way similar to that employed in Borneo and one marvels at the excellent quality of steel which the crude efforts of the "Indios" produce. Europeans and Spaniards have long sought to develop these ores by modern methods but the local scarcity of labor and Spanish red-tape have hitherto played havoc with their attempts.

Copper

Santos is authority for the statement that from 1840 to 1855 twenty tons of manufactured copper were annually exported by the Igorrotes. This race of industrious natives smelted copper many centuries before Magellan's voyage of discovery. The process consists in alternate roasting and reduction to matte, and ultimately to ingots; a process long since introduced from Japan.

Copper ores abound in numerous localities in Luzon, Panay, Mindoro and Luzon. The deposits of northern Luzon are best known and their richness is indisputable. Most of the native workings are located in Bontoc province, some of the producing veins being 7 m. wide and carrying an average of 16 per cent. copper. The gangue is quartz. The bureau of mines has determined the mean composition of the Mancayan ore as follows: Cu, 16.64; SiO_2, 47.06; S, 24.44; Sb, 5.12; As, 4.65; Fe, 1.84; loss, 0.25.

Native copper was discovered in Masbate's mountains in 1847. In 1903 I located a rich deposit of carbonate in Antique province, Panay. Dana mentions a large deposit on Lubang island, near Lubang, and Santos describes chalcopyrite, tetrahedrite, chalcasite and bornite deposits in several Luzon provinces. But little is known of their extent.

Lead

Galena, together with other sulphurets, has been found in several promising localities in Camarines Norte. At Tinga, near the town of Paracale, several lead concessions have been worked during the last two decades, mainly, however, for the gold carried by the crystalline schists through which the galena occurs. Centeno reports valuable deposits of lead chromate in the hornblende schist composing the mountain known as Dinianan, a form of ore closely resembling that occurring in the Ural mountains. The chromate is deposited in quartz veins and is accompanied by vauquelinite.

Lead ore, carrying 56 per cent. lead, has been recently discovered in the island of Marinduque, while a valuable deposit of gold- and silver-bearing galena has been located in central Cebu near the pueblo of Consolacion. The cañons of Mindanao are also known to expose outcroppings of lead and zinc ore, but this great island is so imperfectly explored that nothing further can be said of these deposits.

Gold

Gold is found in nearly every island of the group, and the traveler will find native gold ornaments adorning the robust shoulders of the village belles in the most distant barrios. Mr. Espina, quoting from an early report of La Inspeccion de Minas, says: "Gold is found in moderate quantities nearly all over Luzon, but most particularly and under conditions favorable for exploitation in the following town-

*Mining engineer, Monterey, Mexico.

ships and districts, proceeding from north to south: Throughout Abra province; at Fidelisan, Bontoc province; Suyue, Tubue and Dugon, Lepanto province; Tabio, Capunga and Itogan, Benguet province; Gapan and Peñaranda, Nueva Ecija province; and at Paracale, Mambulao, Labo, Capalongan and Maculabo in the province of Ambos Camarines."

In the province of Abra gold is found in alluvial deposits and in the sands of the river of the same name, as grains, having a fineness of from 0.750 to 0.792. In Lepanto the gold occurs in veins, alluvial deposits and river sands. The Lepanto gold is usually accompanied by silver, copper, lead and iron. In Bontoc and Benguet, the deposits are in all respects analogous to those of Lepanto. In Neuva Ecija the metal is exceedingly pure, brilliant and of an average fineness of 0.958.

Morga mentions the gold mines of the Igorrotes over two hundred years ago, and there is no doubt that they had been worked many centuries prior to that. Until recently, the Igorrotes allowed no one in the vicinity of their workings, and the extent and exact location of the deposits have always been cherished as a tribal secret. These Indians are energetic and gifted with a rare amount of mechanical skill, and while their mining is crude, measured by our standards, it is nevertheless very effective.

Most of the auriferous deposits of Luzon are in gneissic rocks, which also carry zinc blende, galena, and copper and iron pyrites.

On the northeast coast of Negros island, a beach of characteristic gold-bearing black iron-sand stretches for many miles along the sea, but the separation could only be attained through the use of magnets. The fact that platinum (and my analyses have disclosed the presence of iridium with it) is found in the gold-bearing gravels of Mindanao may prove of great value to the scientific world in the near future.

The scope of this brief summary will not permit me to dwell further upon the auriferous deposits of the islands, but one can safely say that the mother-lodes have never been located, unless we except those existing in the Igorrote country of Luzon. How long it will take American enterprise to replace the pan and "arrastra" with hydraulic stream and mill is a matter for speculation.

Pending a definite decision by the central government, the governor-general at Delagoa Bay has ruled that the export duty to be levied on minerals exported under the new mining law shall apply only to minerals mined in the province of Mozambique, says the *South African Mines, Commerce and Industry*, and not to those exported from the Transvaal by way of Delagoa Bay.

Gila River Alum Deposits

Deposits of alum are found in a small arid region in Grant county, N. M., on both sides of the Gila river. These deposits, which are described by C. W. Hayes, of the United States Geological Survey, in "Contributions to Economic Geology," 1906, lie about 27 miles due north of Silver City, and are at present accessible from that point by a wagon road which follows the river down to the mouth of Alum creek.

The alum deposits occupy a nearly circular depression below the general level of the volcanic plateau, the alum rocks consisting of andesitic volcanic breccias.

The most striking peculiarity of the alum rock is its extreme alteration. Careful search failed to reveal at any point within the Alum creek basin a trace of the unaltered breccia, so that its original character could not be determined. Where exposed to leaching as in the upper parts of pinnacles and cliffs, the rock is always porous, giving a hollow sound under the hammer. It is evident that a considerable part of its substance has been removed in solution.

Two forms of incrustations having entirely different chemical composition, are common in association with the alum rock wherever the conditions are favorable for their accumulation. Upon the sides of the cliffs are extensive deposits of material evidently leached out of the adjacent rock and deposited from solution. These incrustations vary in thickness from a few inches to three or four feet. They are generally yellowish white in color, and fairly hard with a porous cellular structure. Within this outer crust the material is much softer and often occurs as a perfectly white powder. This incrustation consists of the hydrated sulphate of aluminum known as alunogen. The white powdery material is very pure and has practically the theoretical composition of alunogen, while the outer crust contains a slight amount of impurities and less than the theoretical amount of water.

The second form of incrustation is most abundant on the walls of the tunnels which have been driven into the alum rock. It consists of halotrichite, a silky fibrous mineral closely resembling asbestos in appearance. It has a pale green color, and a strongly astringent taste. The outer exposed surface of the incrustation has generally lost its fibrous structure, becoming compact and assuming a yellowish color. Although the incrustation may be several inches thick, the individual fibers are rarely more than a third or a half of an inch in length, the crust being made up of successive layers of short crystals. Each layer probably represents the growth of a single season during which the supply of percolating water was relatively abundant. The layers of crystals are sometimes separated by a very thin film of the rock, which has been split off by the growth of a subsequent layer of crystals.

The value of the deposits will depend on the utilization of the soluble sulphates which they contain. The present surface accumulations of alunogen, while probably amounting to many hundreds or more probably thousands of tons, represent but an insignificant quantity compared with the sulphates still in the rock. Wherever observed the rock is highly porous. In the higher and more exposed ledges the rock is thoroughly leached, and will yield nothing more. At lower levels the rock still contains a part of its soluble constituents which are coming to the surface by the capillary circulation of surface waters.

Assay of Copper Ores for Precious Metals

By A. R. Crook

Tests made with a large variety of copper ores from various parts of the country indicate the superiority of the combination wet and dry method of assay over the dry method alone. The combination method gives more accurate results, makes smaller demand upon the time and attention of the assayer, and costs about one-quarter as much for material. In the methods described by various assayers attention does not seem to have been called to the best method of handling the residues obtained after the wet treatment of the ore.

In practice it appears that by far the larger number of ores contain so much insoluble material that they are not adapted for scorification. If the ores are pure sulphides or carbonates, as is seldom the case, the residue can be scorified. Usually, however, they are composed chiefly of quartz or insoluble silicates and consequently the plan to follow is to treat them with a crucible charge adapted for quartzose ores.

A method which has commended itself is as follows: Stir one assay ton of ore into a No. 5 beaker containing 100 c.c. water. Add 50 c.c. commercial nitric acid (sp.g. 1.42). Cover and allow to stand till action apparently ceases. Add another 50 c.c. nitric acid and boil gently till greater part of the free acid has been expelled. Dilute to 500 c.c. and allow to settle. To precipitate the suspended gold and dissolved silver add 2 to 4 c.c. normal salt solution, 5 c.c. sulphuric acid, and 10 c.c. lead acetate. Set aside to settle over night; filter and wash. Dry the residue in a roasting dish, and heat until the paper is consumed and any sulphur present is oxidized. Mix with 1½ a.t. lead oxide, one a.t. of sodium carbonate, 10 grams borax, and 1½ grams argol in a 20-gram crucible; cover with salt, and fire for 30 min.; cupel, part, and weigh.

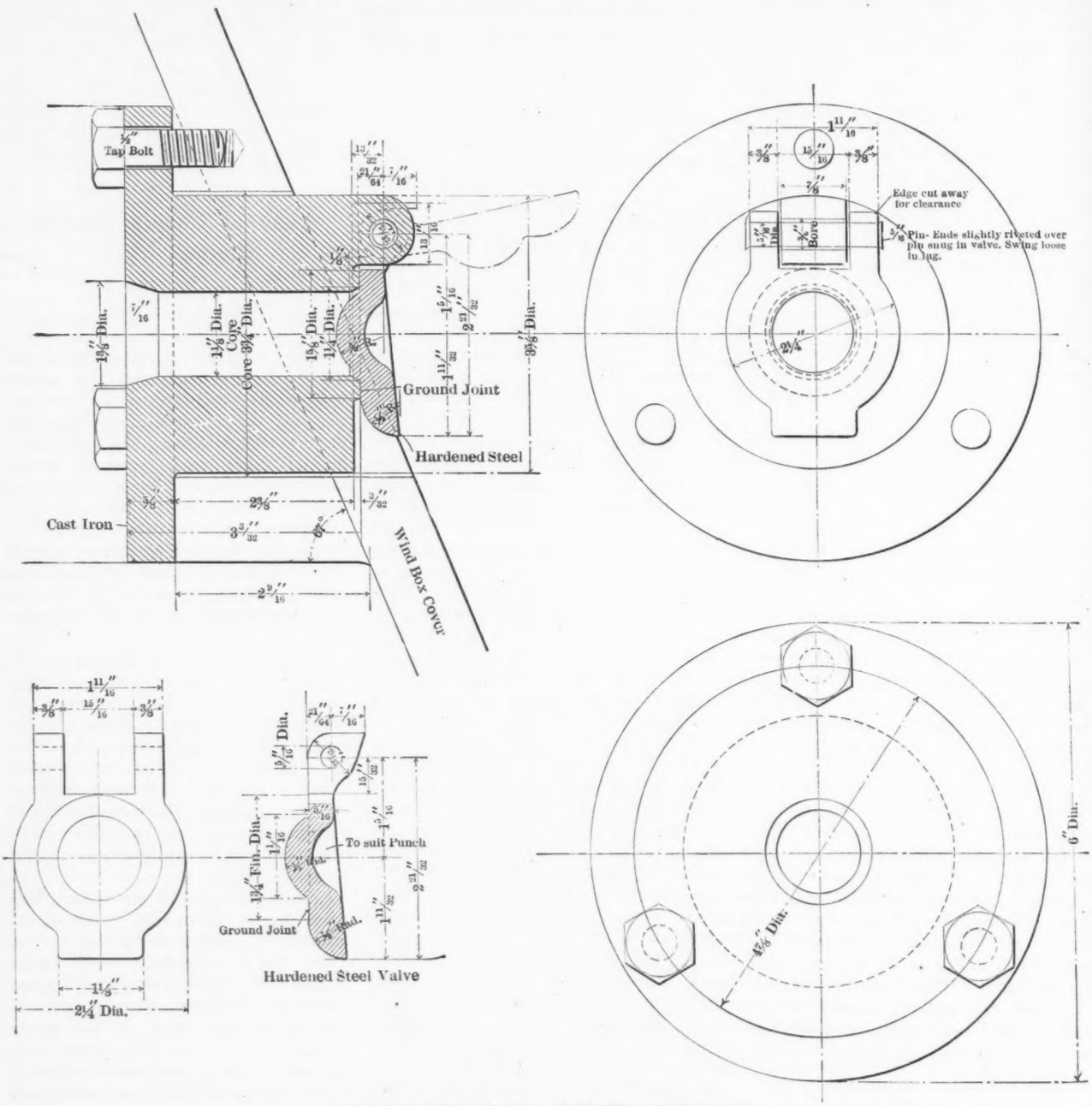
The Cananea Tuyere Valve

A new valve, designed by the reduction division of the Cananea Consolidated Copper Company, of which Charles F. Shelby is superintendent, has been in use since the early part of December, 1906, and gives better satisfaction than any ball valve used at that plant. The trouble with the ball valve is that the seat wears out very quickly and an abnormal loss of air results. This is not apparent to the casual observer, and it is only when records are kept of the oxygen efficiency of the blast delivered by the engines that its full importance is realized. When the seats on the ordinary ball valve become worn, there is a drop of 25 per cent. in the efficiency of the oxygen in the air blown into the converters, meaning a corresponding deficiency in the work delivered by the blowing engines.

In the valve illustrated there are several important features to overcome this point. There is a full 0.25-in. surface on the ground joint, which means a long life, and the valve will remain practically air tight until the punching rod wears away this amount of metal on the bottom side of the punching hole.

The valve itself has a spherical boss which is case-hardened (as well as the ground joint) and takes the brunt of the punching rod, which never comes in contact with the bearing surface; the end of the valve is rounded off so as to give the same effect as a ball in drawing out the punching rod, and the valve will not catch on any projections on the rod. The rod, on which the valve hangs, has a 1/16-in. play in order to provide a perfect valve seat and to prevent it from turning completely over when pushed out of the way by the punching rod. A tangential extension is also provided at the top of the valve to prevent it from turning over.

This device is not patented, is giving satisfaction, operates as easily as the ball and lasts longer.



DETAILS OF THE CANANEA CONVERTER-TUYERE VALVE

To avoid the disadvantages arising from the use of red lead in luting the flanges of steam pipes, there has recently been introduced a preparation of zinc gray and tung-oil. The paste hardens rapidly when heated.

Compressed Air in Mining

By J. H. Hart*

The use of compressed air in mining operations is so general in its application that it is a subject for remark that the production of compressed air has not achieved a more efficient status in the mechanical world that it has today. The modern compressor wastes more than 40 per cent. of its energy in the machine alone. This applies to compressors of the reciprocating type and no rotary compressor capable of giving a pressure over 5 lb. is in commercial operation.

The reasons are mechanical, but the fact remains that the reciprocating compressor is extremely inefficient. The friction factor alone takes nearly 40 per cent. of the work. The compression is in every case almost adiabatic, and compressed air is used in spite of all these difficulties only on account of its wonderful adaptability as an energy reservoir and its range of usefulness and ease of application in difficult environment.

Falling-water Compressor

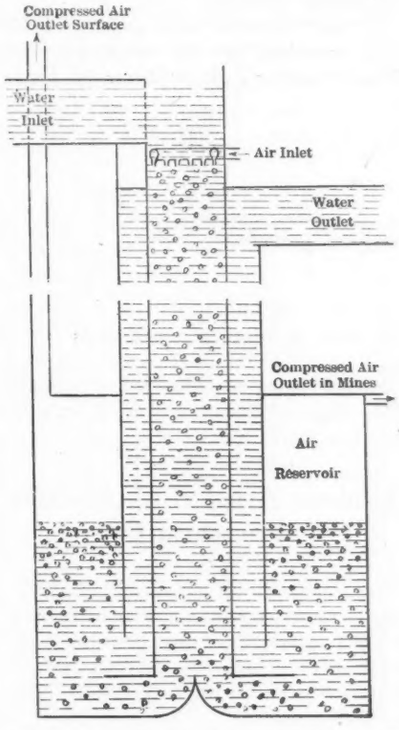
There is, however, one method of making compressed air which is simple, efficient, practical and isothermal, and, in comparison with a reciprocating compressor, possesses almost twice the efficiency with a cost of only a fraction of that machine. That mining operators and owners are not more familiar with this process of compressing air is a matter of regret, but it is to be expected, as the process has not been exploited or developed except in a few instances. The process referred to is known as the water-compression system and is in active and efficient operation at Magog, Quebec, Norwich, Conn., and a number of other places. These plants produce compressed air in large quantities very efficiently with a minimum cost of operation and a minimum cost of installation. There are, however, patent rights involved in the process which may be responsible for its lack of development in other fields. However, the process is so simple and efficient that it could stand a large royalty and still be on a par with the ordinary compressor.

Principle of Operation

The process is extremely ingenious and was so simple in theory and practice that it was utterly condemned by a number of consulting engineers before being put in active operation. A description of the plant will explain its operation. Water is carried in a large pipe on a slight slope to the edge of a vertical pipe of any desired length. It is then allowed to fall down this pipe. An annular hollow ring with a large number of fine points on the lower side is immersed in the water at its entrance in the hole and this is connected with a pipe to the outside air.

The water flowing by these small holes, which are often extended into projecting hollow needles for increased efficiency, entangles and carries with it small bubbles of air caught at the points of these needles. Rushing down the pipe, it gradually compresses the bubbles, and if the water is suddenly turned at the bottom into a fairly large reservoir, it comes to rest and the bubbles rise to the surface under pressure. A pipe carries the water from this reservoir to the surface.

The difference of level of the inflowing and outflowing water need only be a few feet in order to produce rapid flow, and the pressure obtained depends simply on the depth of the hole. The pipes are so arranged that the inflowing pipe is inside the outflowing conduit so that only one hole is necessary. The reservoir at the bottom is merely an enlargement of the hole, and is generally lined with metal.



PLAN OF PLANT FOR COMPRESSING AIR BY MEANS OF FALLING WATER

The operation is extremely simple. Air collects in the lower reservoir, which is connected by a pipe with the upper ground, and can be drawn off under pressure, as desired. When the reservoir becomes full the machine automatically relieves itself, the surface of the water in the reservoir being lowered to the entrance of the outflowing pipe and the excess of air being thus automatically carried off with the outflowing water. It requires absolutely no attention and compressed air can be obtained in any quantity, the amount depending simply on the quantity of water rushing through the pen stock and its speed.

The efficiency of a plant of this kind ranges from 75 to 83 per cent. of the theoretically possible efficiency obtainable from the water. The efficiency of a reciprocating compressor on the other hand is seldom greater than half of this, besides the requirement of a steam engine to operate the compressor. The first cost is but a fraction of that required in the ordinary methods of compression.

Advantage in Mining

In mining operations, especially, this development seems to be especially applicable and free from most of the very few limitations necessary in other utilizations. For instance, in many mining operations the hole is already there. All that is necessary is to put in two pipes with a large box at the bottom and turn in the water. In this case the pipe is always open to inspection, and can be readily repaired whenever repairs, which occur seldom, become necessary. In addition, the compressed air is on the spot ready for use.

The loss in pressure due to its passage through pipes from the surface is diminished and the compression is carried on isothermally, so that the air can pass, if desirable, through a heater for increased efficiency. The compression is carried on isothermally and hence the heating can be put in just where it is desired for best work, and does not interfere before this point. Every development in this line points to an increased efficiency, and there is nothing which tends to diminish it.

It is remarkable that this process for the production of compressed air has not been developed more than it has in mining engineering. The Norwich company has been in active operation since its inception, has paid large dividends, and supplies the entire town with compressed air at 90 lb. pressure. The only lapse in the operation of the plant occurred a few years ago through the breakage of the dam which gave a head to the water and rendered a supply available. As a practical, efficient process for the compression of air it is unexcelled, and its development in mining engineering is hampered merely by the lack of knowledge of its possibilities.

According to the *Journal de l'Electrolyse,* of Feb. 1, 1907, the Société de Métallurgie Electro-Thermique du Chili, Jan. 16, recently sent Mr. de St. Seine, a mining engineer, to Chile, to examine its copper mines and water resources, and estimate the advantage from adopting his electro-thermic furnace. His report demonstrates that in the Cachapoal district a considerable amount of copper can be obtained from the company's mines, and from custom ores. Experiments to develop the furnace will soon be undertaken.

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Taxing Texas Oil Production

SPECIAL CORRESPONDENCE

The fight of the Texas oil producers in the legislature at Austin against the gross receipts tax bill overshadows all other news. The proposed bill is manifestly unjust to all persons engaged in the petroleum industry, which has brought so much benefit to the State. The bill imposes a tax of 2 per cent. on all oil producers; 4 per cent. on pipe lines; 4 per cent. on wholesale dealers, and 4 per cent. on retail dealers. The taxes are practically cumulative, as nearly all the petroleum marketed will be subject to at least three of the specified taxes, or a total tax of 10 per cent. on the gross value. Refiners are already paying more than the crude is worth for refining purposes, and only transportation conditions—which will be changed very shortly—warrant the use of Texas crude oil by them. Fuel users cannot pay any increased price for coal, and mid-continent crude will be cheaper than coastal crude. Louisiana and mid-continent crude would only be liable to a tax of 4 per cent. In refined products the Standard Oil shipments from Eastern points would also be given a decided advantage over those of their Texas competitors.

Various delegations, representing the oil producers and allied interests, have made a vigorous protest and showed conclusively that their interests always have been heavily assessed, Jefferson county alone showing an increased assessment of $18,000,000; that practically only one company engaged in drilling for and marketing petroleum had ever made 10 per cent. on the investment, and that the proposed tax was both unjust and absurd. The strong opposition to the bill will probably result in some modifications, but the oil industry has large investments confined to a very few counties. The State must have more revenue, so that the legislature, composed as it is mainly of representatives of agricultural interests, will saddle the new taxes on the mining and manufacturing communities.

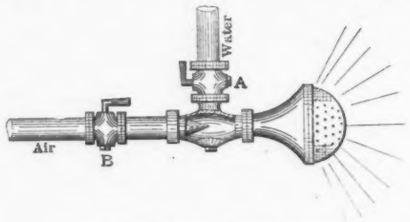
Another bill which has been favorably reported by a senate committee provides for a flash test of 140 deg., and a fire test of 160 deg. F. on all kerosene. This bill seriously threatens refinery interests in the State, for the products made by them are usually of 120 flash test and 125 to 130 fire test. This present grade has given general satisfaction, and the enforcement of the proposed bill will undoubtedly strengthen the market for Eastern oils and cause serious loss to local refineries. The oil interests have received no encouragement or aid from the State, and have been burdened with high taxes. The State Geological Survey has been abolished, and the mineral resources of the State neglected. In fact the settled policy of the legislators is, apparently, to discourage all mining and manufacturing industries.

A Combined Air and Water Spray*

For settling dust produced when dry lode-rock is crushed in a rock breaker, a combined air and water spray has been designed by Thomas White. A spray of water alone generally has too great a volume, but the quantity of water may be reduced to a minimum if compressed air is used as the carrier.

The taps *A* and *B* regulate the quantities of water and air respectively and the spray may be varied from moist air to a full stream of water.

A "rose" nozzle is used, which varies in size according to the work required. When used for rock crushers, the nozzle



AIR AND WATER CONNECTIONS

should be larger than for drill holes, and in all cases should be applied directly to the place where dust is produced.

Chambers Auger Brick Machine for Briquetting Ore

The Chambers No. 7 auger brick machine, manufactured by the Chambers Brothers Company, Philadelphia, is used for briquetting fine ore and flue dust in the smelting works at both Great Falls and Anaconda.

The machine is built with heavy shafts and is designed especially to stand unusual strain. A double-shaft mixing machine is placed on a platform over the machine, discharging directly into the hopper. The material as it comes from the machine is stiff enough to bear handling and piling on edge about seven courses high. The brick machine and mixer weigh about 15 tons. The capacity is equivalent to about 5000 or 6000 standard-size building brick per hour, depending largely on the nature of the material, as some materials can be forced through the machine more readily than others.

The machines at Anaconda are so speeded that they can make each 750 tons wet weight of brick per day of 24 hours. The moisture in the bricks is about 13 per cent., and the bricks are made up of fine ore, fine concentrates, slimes, coke and partly burned coal, which is obtained by jigging the reverberatory ash. No binding material is used, but as the material contains considerable alumina, the bricks in drying become quite hard. They are, however, not allowed to dry, but are passed from the brick machines directly into bins, each bin holding about the quantity required for one blast-furnace charge. By an arrangement of levers the whole train of blast-furnace cars is loaded at once, the other material for the charge, such as limestone, ore and coarse concentrates, being dumped in the cars afterward and before reaching the furnace.

The auger and also the "former" are made of hard cast iron. When flue dust is used, it has been found advisable to use composition metal for these parts. At Great Falls the average composition of bricks for the last quarter of 1905 was as follows:

SiO_2	35.2 per cent.
FeO	23.2 " "
S	22.5 " "
Al_2O_3	11.9 " "
CaO	0.4 " "
Cu	7.14 " "

The machine at Great Falls is not run as fast as those at Anaconda, 90 tons per day, 8-hour shift, being the duty at the present time. Some flue dust is used, but the principal ingredients are slimes, fine ore and fine concentrates. The machine is run by an electric motor of about 55 horse-power.

*Abstract from the *Bulletin of the Inst. of Min. and Met.*

Trojan Non-freezing Powder

Trojan non-freezing powder, manufactured by the Independent Non-Freezing Powder Company, Allentown, Penn., is an explosive compound said to contain no nitro-gycerine or picric acid. It is claimed that the powder will not freeze and that on explosion no injurious fumes are given off. The powder is reported to have an explosive force equal to that of nitro-glycerine dynamite, and that in two years of practical rock-drilling tests the powder has met all requirements. It is put up in cartridge form and can be detonated by ordinary methods.

One of the advantages claimed for the new explosive is that the absence of poisonous gases permits the workmen to return to their work immediately after blasting.

Practically all the California and Texas fuel oils contain more or less water, sand, asbestos, fiber, and marsh gas, says the *Paint, Oil and Drug Review*. Some grades of oil flow freely, while others are more viscous even though they have a lower specific gravity. In general, the specific gravity of these oils ranges from 14 to 20 deg. Beaume.

Breaker of the Pacific Coal Company in Alberta

At This Canadian Plant Both Anthracite and Bituminous Coal From the Same Mine Will Be Prepared For the Market

BY LEWIS STOCKETT and B. R. WARDEN *

The coal breaker recently erected for the preparation of the anthracite coal mined by the Pacific Coal Company may be a matter of interest to mining men, and should be a matter of pride to Canadians, as it is the first plant of this kind to be erected on Canadian soil.

The geology of the field has been described in other papers, and it is not therefore the purpose of this article to give any description thereof. Seven of the seams have been developed up to date, and a cross-cut tunnel driven across the measures will develop the remaining beds, the prospecting work having shown that there are at least twelve seams in the basin. Of the seven opened up, four are being worked; one is used for the main haulage road and air courses and two are not being worked on account of the friability of the coal and the large percentage of the smaller sizes they make, the market for which is at the present time somewhat limited, but is being extended as the proper appliances for burning these small sizes under boilers are put in.

An average analysis of the coal is as follows:

	Per Cent.
Moisture	0.50
Volatile	8.00
Fixed Carbon	83.50
Ash	8.00
Sulphur	0.40
Specific Gravity	1.40
Ash, White	
British Thermal Units	14,000

Note—From the *Journal* of the Canadian Mining Institute, Vol. IX.

*Bankhead, Alberta.

In the preparation of anthracite coal, machinery is required to screen out all the dust, remove all the impurities, such as rock, sulphur balls, slate and bony coal, and separate it into several sizes. These sizes, conforming very nearly with the practice of the anthracite collieries of Pennsylvania, are divided as follows:

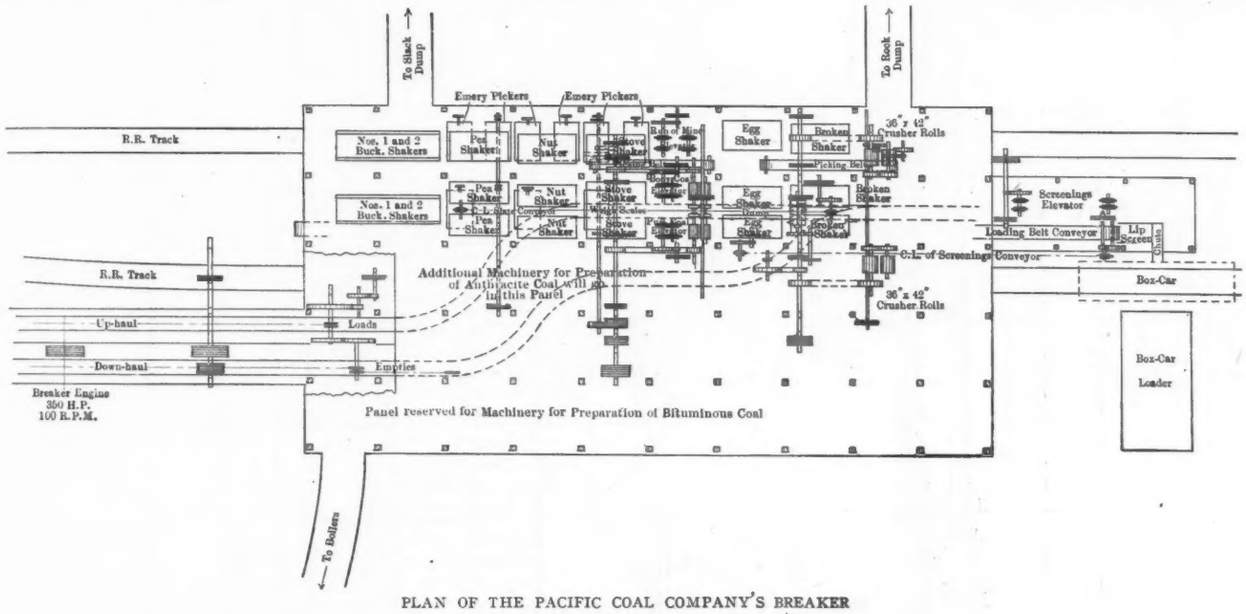
Broken, through 3-in. bars and over 3¼-in. round holes.
Egg, through 3¼-in. holes and over 2¼-in. holes.
Stove, through 2¼-in. holes and over 1½-in. holes.
Nut, through 1½-in. holes and over 1-in. holes.
Pea, through 1-in. holes and over 9/16-in. holes.
Buckwheat No. 1, through 9/16-in. holes and over 5/16-in. holes.
Buckwheat No. 2, through 5/16-in. holes and over ¼-in. holes.
Buckwheat No. 3, through ¼-in. holes and over ⅛-in. holes.
Dust, through ⅛-in. holes and over ⅛-in. holes.

All the sizes are marketed with the exception of buckwheat No. 3 and the dust, the latter of which, preparations are being made to briquet, and buckwheat No. 3 will be used under the plant boilers as more and more of the buckwheat No. 2 is taken by the general market.

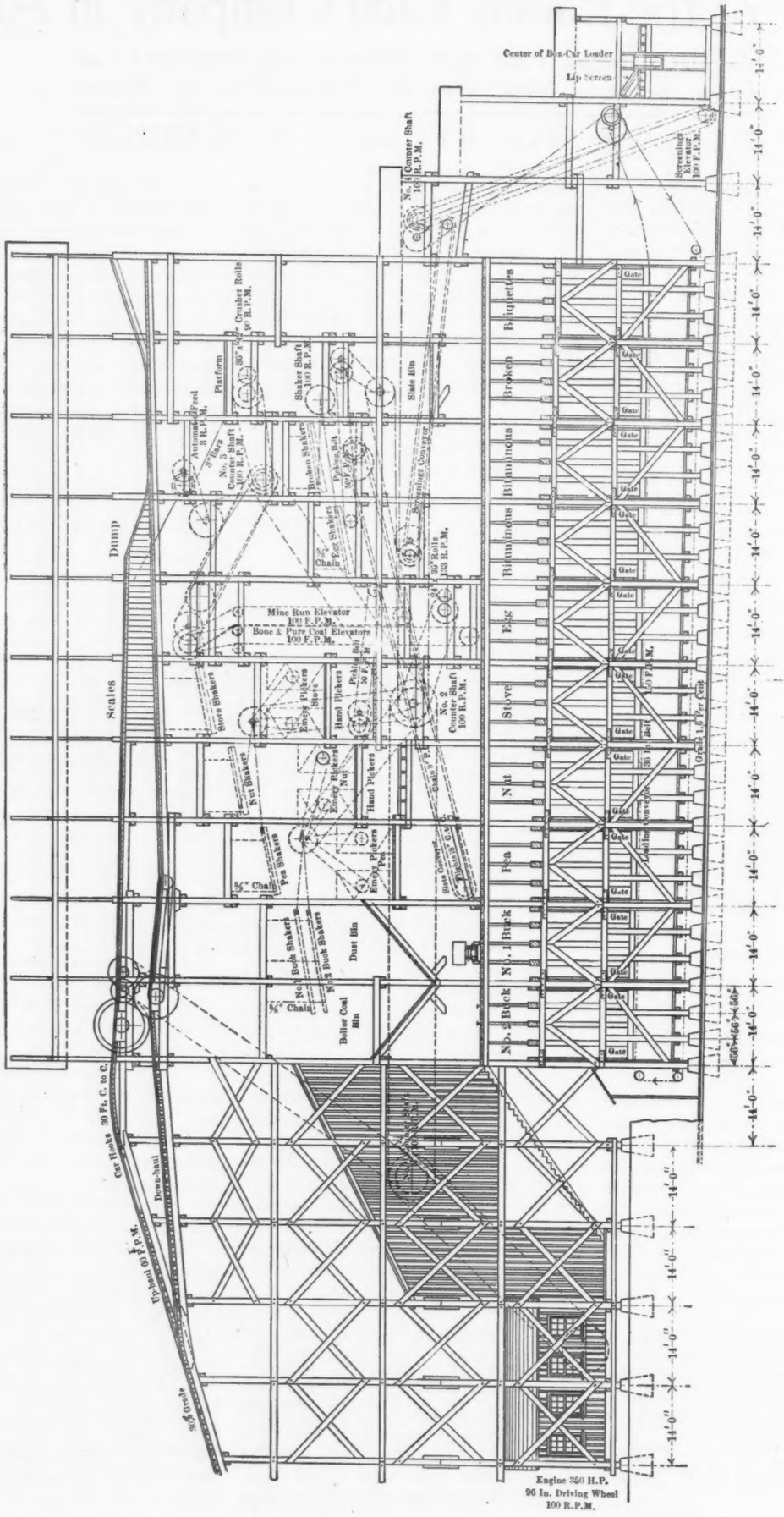
Receiving the Coal

The accompanying diagram gives graphically the method used in the preparation. The coal is hoisted to the top of the breaker (100 ft. above the railroad tracks) by means of an endless chain, traveling 60 ft. per min., with hooks spaced 30 ft. apart, to engage the axles of the mine cars. This will deliver two cars per min. The capacity of these cars is something over two tons, giving a capacity of 2400 tons per day of 10 hours, which can be increased by spacing the hooks 20 ft. or even 15 ft. apart as may become necessary. The empty mine cars are returned down the incline by another endless chain, traveling at the same speed and with hooks spaced 12 ft. apart, to which they are fed by an auxiliary chain so arranged that as the cars are delivered to the main chain a hook is waiting in readiness for each car and the car is delivered to the chain without shock. The grades of the track are such that the car handles itself, from the time it leaves the top of the uphaul chain until it arrives at the top of the downhaul chain. The tracks at the bottom of the incline also have their grades arranged so that the loads feed into the bottom of the incline and the empties run away from it.

The coal after passing over a scale which weighs it as it passes, is dumped by means of a crossover tipple, into a dump chute, and fed by an automatic feeder regularly over a set of screen bars with 3-in. spaces on to a platform. This automatic feed revolves 1½ r.p.m., has four compartments, each of which contains about 1000 lb. of coal, so that it has a capacity of two tons at each revolution, or three tons per min., and 1800 tons in 10 hours.



PLAN OF THE PACIFIC COAL COMPANY'S BREAKER



LONGITUDINAL SECTION OF THE PACIFIC COAL COMPANY'S BREAKER, SHOWING SYSTEM OF DRIVES AND LOCATION OF SHAKERS AND PICKERS

The First Separation

On the platform the material is sorted and the rock and slate pushed into the rock bin, the coal is separated, the lumps of pure coal going through a set of rolls and broken up into marketable sizes, and the lumps containing a portion of bone or slate through another set of rolls to be likewise broken up and to allow the removal of the pieces of bone and slate. These rolls revolve at 90 r.p.m., are 36 in. in diameter, and 36 in. long, and have inserted steel teeth 1¾ in. square and 3½ in. long, spaced 4¾ in. apart and set diagonally.

From here we have three separate and distinct streams of coal, which, on account of their different characters, require different treatment, and by keeping them separate until they reach the loading bins, to be loaded into the railroad cars, they are enabled to get the preparation they require.

The "pure coal" as it comes from the rolls needs only screening to take out the dust made in the breaking, and to separate it into the different sizes, any pieces of slate or bone which may appear being removed by hand.

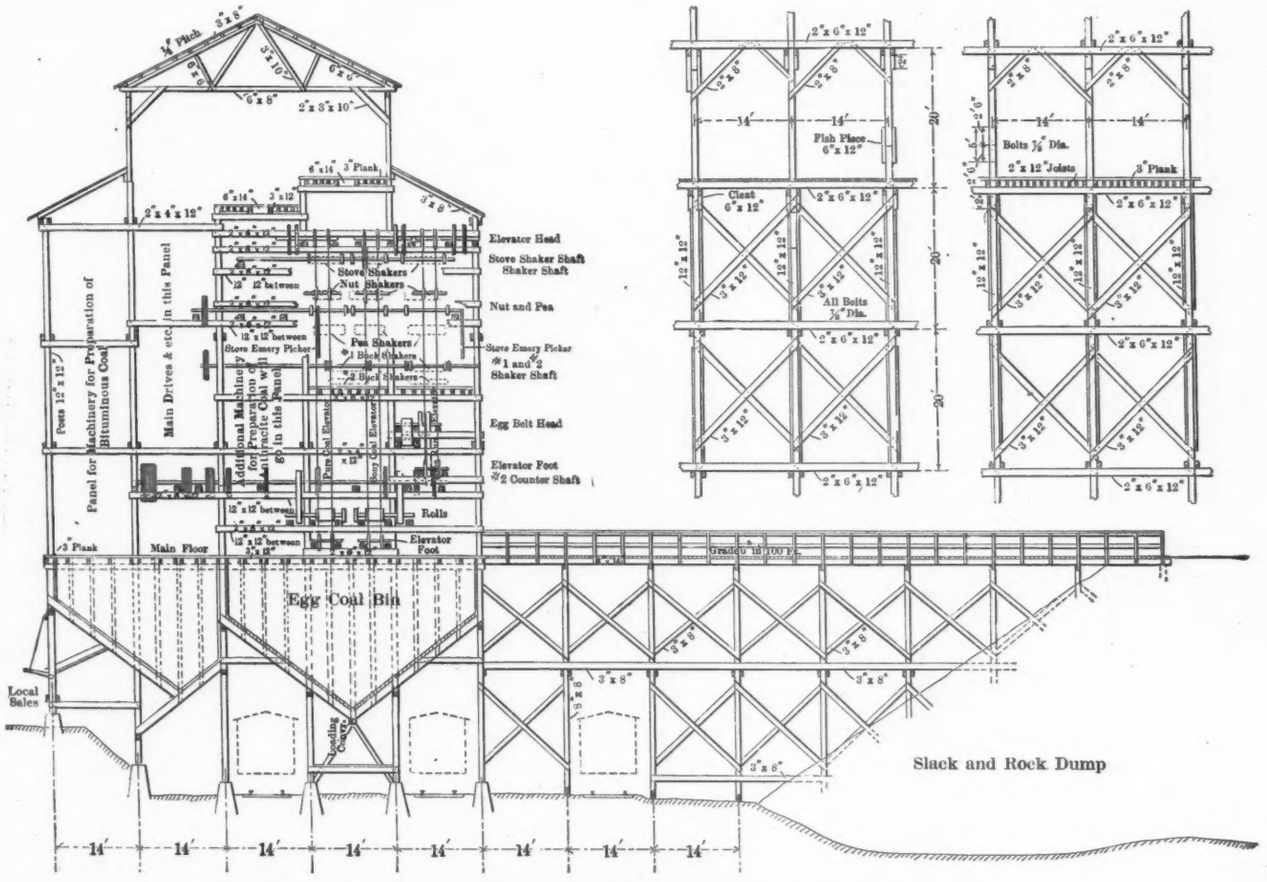
The "bony coal" not only requires this, but also thorough cleaning of the pieces of slate and bone; this is accomplished in the broken and egg sizes, by passing from the screen on to a picking band, from which the impurities are removed by hand picking, the rock and slate going into a conveyer which takes it to the rock bin, and the pieces containing both coal and slate or coal and bone to another set of rolls to be broken up smaller, so that the coal can be saved in the smaller sizes.

The Smaller Sizes

What remains after the broken and egg sizes are taken out is elevated to the top of the building and, passing over another set of screens, is separated into stove, nut, pea, buckwheat Nos. 1 and 2 sizes, the dust going into the dust bin, to be hauled out and dumped on the waste bank at the present time; later on, a briquet plant is to be erected to briquet this dust. The stove coal, after it leaves the screen, goes over a mechanical picker, known as the "Emery" picker (Fig. 1), which removes the slate and bone. The coal from this picker and also the refuse are picked by hand to save any coal that may be thrown out with the slate, and to remove any pieces of slate which the machine has failed to remove. The coal then passes to the bins, and the refuse to a conveyer to be conveyed to the rock bin. The nut and pea coals are similarly treated, with the exception that with the pea there is no hand picking. The No. 1 buckwheat, as it leaves the screen, passes over slater bars which remove the flat pieces, and as these flat pieces are nearly all slate, cleans the coal with very little loss. The No. 2 buckwheat is found to be sufficiently clean without any further preparation, and goes direct to the bin.

The "mine-run" coal, that portion which passes through the 3-in. bars above the platform, is conveyed to the broken screen by means of a chute, the bottom of which has ¼-in. square perforations to remove the dust, which falls into the dust bin; the broken screen removes the broken size, the remainder passing over 3/16-in. round perforations on the bottom of the broken screen, which removes the remaining dust. This broken coal joins the broken coal from the "bony coal" stream on the same picking band to have the refuse removed. The egg size has similar treatment, and the remainder is elevated to the top of the building, to go through a like treatment as the "bony coal" stream, with the exceptions that, containing a larger proportion of impurities, it has double the number of Emery pickers and hand pickers, and the nut and pea sizes pass over slater bars which remove the flat pieces.

The screens on the "mine-run" side are 6 ft. wide and 12 ft. long, with the exception of the buckwheat screens, the No. 1 being 5 ft. wide and 18 ft. long, and the



CROSS SECTION OF THE PACIFIC COAL COMPANY'S BREAKER, ALSO SHOWING SYSTEM OF FRAMING

No. 2, 6 ft. wide and 18 ft. long. Those on the "pure coal" and "bony" sides are 4½ ft. wide by 12 ft. long, with the exception of the buckwheat screens, which are the same size as those on the mine-run side. They are built of steel plates and angle iron, suspended on ⅝-in. chains and are driven by eccentrics having 6 in. travel and running 100 r.p.m. The pitch of the screens is 2 in. per ft.

The "mine-run" elevator is of the continuous-discharge type, with deflecting shafts to give a more perfect discharge; having buckets 24x12 in., each bucket containing 80 lb. of coal when level full, the speed is 66 buckets per min., giving a capacity of about 2½ tons per min., or 1500 tons per day of 10 hours. The "pure" and "bony" coal elevators are of the same type as the "mine-run" elevator and both alike as to size, having buckets 16x8 in., containing 22 lb. of coal when level full, and at a speed of 100 buckets per min., give a capacity of one ton per min., or 600 tons for the 10 hours. The combined elevating capacity of the three elevators is 2700 tons per day of 10 hours.

Removal of Slate

The material to be separated is fed over the inclined chutes by feeders. The lower ends of these chutes are slate slabs, and as the material is fed over them the difference in the specific gravity of the coal and of the refuse, and also the difference in shape, causes a difference in the friction, that of slate being the greater as it passes over the slate slab, which retards the movement of the slate so that it falls into the opening and thence into the slate chute, the coal acquiring velocity enough to jump the opening at the bottom and pass on into the coal chute. Both the pitch of the slab and the width of the opening are readily adjustable by means of levers, and these are adjusted to meet the requirements of the coal and changed when found necessary. The feeders oscillate 65 times per min., and it is to this regularity in the feed that the success of the machine is largely due. The capacity of each picker is 100 tons per day of 10 hours.

The slater bars are shown in the accompanying cut. These are set on the end of a screen, or in a chute, where the coal can slide over them. The flat pieces fall through the narrow openings, and as nearly all of the flat pieces are slate, by getting the proper width of opening all of the flat slate is removed, leaving those pieces of slate which are the same size as the pieces of coal to be dealt with by the Emery picker and hand picking.

The hand picking is done on picking bands for the larger sizes and on inclined chutes set at pitches varying from 4 to 5 in. to the foot for the smaller sizes. Chinamen and boys are employed for this purpose.

The Larger Sizes

A set of re-breaking rolls, 24 in. in diameter and 36 in. wide, with 1¼-in. square steel teeth 2 in. long, set diagonally and spaced 3¼ in., revolving at 133 r.p.m., is provided for re-breaking the broken and egg sizes into stove and smaller sizes when the market conditions are such that a larger proportion of these sizes is required than is ordinarily made.

A set of bony rolls of the same diameter and width and running at the same speed as the re-breaking rolls, with steel teeth 1 in. square and 1½ in. long, set diagonally, and spaced 1 15/16 in., is provided to break up the pieces containing both coal and bone or coal and slate, picked from the broken and egg-picking bands.

The material from the re-breaking rolls is elevated in the pure-coal elevator to the screens above, to be separated into sizes, and the material from the bony rolls is likewise elevated in the bony elevator to the screens above, to be separated into sizes and cleaned.

The stove, nut and pea sizes, after preparation, are conveyed into the bins by means of spirally inclined chutes to save the breaking of the coal. These inclined chutes extend from the top to the bottom of the bins, and the coal slides down them until it reaches the pile of coal in the bottom of the bin or wherever it may be. The broken and egg sizes are

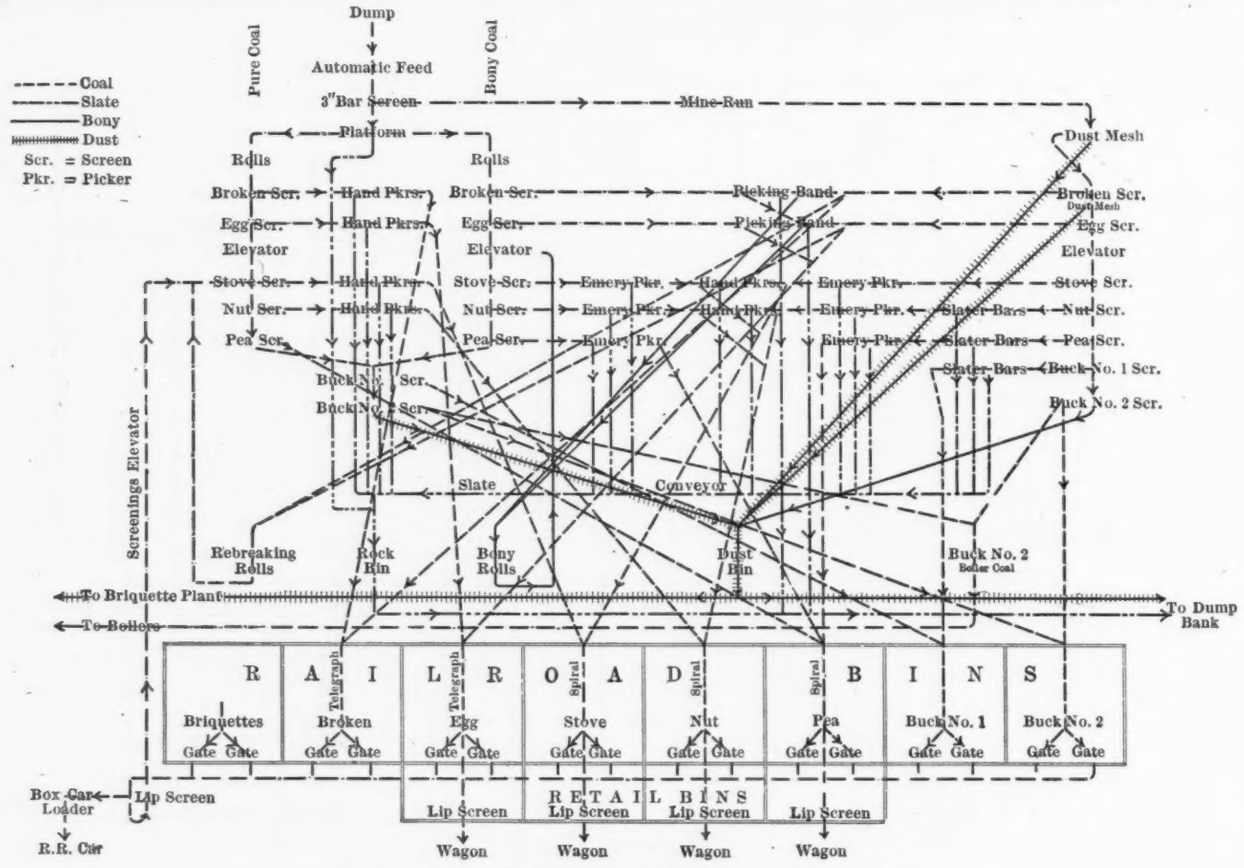


DIAGRAM SHOWING METHOD OF PREPARING ANTHRACITE COAL

conveyed to the bin by straight inclined chutes, called telegraphs; it having been found that the spirally inclined chutes would not work well with these larger sizes.

Conveyers

From the bins the coal is drawn out through gates to a belt conveyer, 36 in. wide and running the full length of the building at a speed of 150 ft. per min., which conveys it to a lip screen set on an inclination, with different sized perforations for the different sizes of coal. This screens out any dust and smaller sizes that may be in the coal before it passes into open cars direct or to the box-car loader, to be loaded into box cars. From this lip screen an elevator conveys the screenings to the top of the bins, where a conveyer takes it to the pure-coal elevator, to be elevated to the screens above and separated into such sizes as it will make.

This lip-screen elevator is of the same size as the bony and pure-coal elevators, simply not to have too many different-sized pieces of machinery, but is run at one-half the speed.

The screenings conveyer is a flight conveyer, working in an iron trough with 16x8-in. flights every 36 in., and having a speed of 100 ft. per minute.

The slate and other refuse from the various picking machines and hand pickers slides by gravity into a flight conveyer, similar to the screenings conveyer, except that the flights are spaced 18 in. apart, giving double the capacity.

The box-car loader is the Victor loader, and is run by its own engine with steam from the main boiler plant.

Power is furnished for all the rest of the machinery, including the hoisting on the incline, by a 16- and 28x36-in. cross compound horizontal engine, running at 100 r.p.m., using steam at 120 lb. pressure in the high-pressure cylinder and capable of developing 350 h.p.

All of the drives are 1½-in. Manila rope, except a few short drives where rubber belting is used. The main drives are continuous ropes with tension carriages, and the side drives are loops, the plan being followed of putting one more loop on each drive than was necessary, so that in case of one coming off or breaking, the plant could still continue to run. Splicing and shackles of different kinds have been tried on the ropes with the result that the splicing, while troublesome until a rope gets stretched, and taking longer to make, has been found the most satisfactory. All of the main lines of shafting in the breaker run at 100 r.p.m., from which the required speeds for the different machinery are made by a difference in the size of the pulleys or rope wheels, and where a very slow speed is needed, by pinions working into larger spur wheels.

Buildings

The foundations of the building and machinery are all of concrete, the gravel and sand for which were had from the excavations. Eight hundred and fifty barrels of cement were used. The posts of the building and inclines rest directly upon piers.

The timber used was coast fir, about 1,000,000 ft. b.m. being used; no mortises and tenons, gaining or dapping were used, and the style of framing may be described as continuous posts, spliced together, with all cross timber, braces, etc., bolted on, these cross timbers when necessary being further supported by wooden brackets bolted on. As a square, crosscut saw, auger, hammer and monkey wrench were the only tools used, it gave a quicker and cheaper method of erecting. There is not the settling due to rotting of mortises and tenons, the drying out of the timber or the load being carried across the grain of the wood. There is also a great stiffness, which in a building of this kind, where there is so much moving machinery and vibration resulting therefrom, is necessary. As the timber dries out, all that is needed is to go over the bolts and tighten them up. The building has proved to be solid and free from shaking, either from the movement of the machinery, or the wind pressure from some severe winds which have occurred since erection.

The building is heated by direct steam in coils of 2-in. pipe, about 5000 linear feet being used for the purpose. The lighting is done with 16-c. p. incandescent electric lights, about 200 being used. For fire protection there are two fire plugs on the outside of the building, with two connections on each plug for 2½-in. fire hose, the water pipes having a head of 400 ft. Also two stand pipes, one at each end of the building, with hose connections at three different hights, having a hose and nozzle always attached and requiring but the opening of a valve. Sixty fire buckets set in convenient racks and standing full of water are ready for immediate use on the breaking out of a fire.

The rock and dust are hauled out over trestles in iron dump cars holding 1½ tons each by a 6x10-in. compressed-air locomotive, weighing 5 tons, to the waste bank. The dust will later be taken by a flight conveyer to the briquetting plant, and the resulting briquets returned to the breaker by the same method.

Every car of coal loaded is sampled and tested for the percentage of slate, bone and small sizes contained in it; if it does not come within the following table of standards adopted by the Pennsylvania anthracite market, it is unloaded into the breaker to be recleaned:

	Slate	Bone	Undersize
Broken	1	2	0
Egg	2	2	0
Stove	4	3	0
Nut	5	5	15
Pea	10	..	15
Buck. No. 1	15	..	20
Buck. No. 2	..	..	30

Duplicates of all the pieces of machinery which are liable to break or wear out have been provided and are kept conveniently placed so as to be quickly put in.

Excavation was commenced	April	3,	1905
Foundations were commenced	April	14,	"
Framing was commenced	May	27,	"
Erection was commenced	May	31,	"
First machinery placed	July	24,	"
Foundations finished	July	25,	"
Erection finished	Oct.	14,	"
Machinery finished	Oct.	28,	"
Breaker tried	Nov.	6,	"
Breaker started up	Nov.	13,	"

The cost of the breaker and incline is shown in the table below:

General expense	$ 3,076.73
Labor	34,829.35
Lumber	15,709.97
Cement	4,238.90
Iron and Hardware	6,209.34
Machinery	30,262.45
Freight	17,414.19
Duty	4,740.08
Power, tools, etc.	815.66
Pipe and fittings	1,561.72
Electric supplies	317.19
	$119,175.58

The force required to man the breaker is as follows:

Breaker engineer	1
Oiler	1
Bottom man	1
Car oiler	1
Sprągger	1
Top man	1
Weighman	1
Dumpers	2
Platform men	5
Screen men	6
Emery picker men	3
Hand pickers	35
Dirt bank men	4
Locomotive engineer	1
Locomotive switchmen	2
Laborers	5
Box car loader engineer	1
Box car loader men	4
Foreman	1
Carpenter and repairman	1
Weighman	1
	76

The breaker is not complete until another side of mine-run machinery will have been installed, which will require another dump, bar screen, platform, screens and elevator; it will then be abundantly able to handle 2000 tons of material per day of 10 hours. After the additional mine-run machinery is installed, there is still a vacant panel in the breaker and also a set of bins; these are being reserved for bituminous coal, the prospecting having shown that there are bituminous veins on the property which will be reached in time. We will then have something unique in coal preparation; that is, both anthracite and bituminous coal from the same mine and loaded from the same building.

According to G. P. Scholl, the best conditions for operating a tube mill are to deliver the pulp to the mill in a fairly thick state, say about 50 per cent. moisture; under these conditions the output will be a maximum and the wear and tear of the lining and pebbles a minimum.

Colliery Notes, Observations and Comments

Practical Hints Gathered from Experience and from the Study of Problems Peculiar to Bituminous and Anthracite Coal Mining

DEVELOPMENT AND MANAGEMENT

As showing the cosmopolitan character of the miners in Pennsylvania, it may be stated that the special rules are printed in 32 different languages.

All miners timbering in roadways or removing loose roof should set temporary props, so as to make the place safe for themselves while repairing it.

The empty track in the gangway at the foot of a plane or slope should be on the upper side of the haulage road, while the loaded track should be on the lower side.

Careful investigation shows as a general rule that where an explosion of gas and dust has taken place, the deposit of coked dust is deposited on the opposite side of the timber, to that facing the direction in which an explosion travels.

The report of the commissioners who investigated the cause of the Wingate colliery explosion in England states that the area affected by the explosion was practically coincident with the area over which coal dust was present in sufficient quantity.

The anthracite coal output for the first 3 months of 1907 amounted to 15,047,814 tons, as compared with 15,967,350 tons during the same period last year. This decrease is of little significance, as the production during the early part of 1906 was abnormally large.

It is most advisable, whenever possible, to have conditions so arranged that the hoisting engineer will be able to see the one cage leave the pithead and the other cage arrive at it. Over-winding and other serious accidents may often be prevented by adopting such a plan.

The illuminating power of safety lamps varies in different makes, and much depends on the kind of oil used; other things being equal, however, the following lamps are arranged in ascending order according to their illuminating power: Georgy, Davy, Clanny, Muesseler, Thomas, Marsant, Ashworth, Hemplewhite, Gray and Wolf.

It has been shown by experiments on a large scale that the effective power of an engine pulling a loaded trip of 20 cars up a plane 5900 ft. long with an average grade of 5 per cent. is 50 per cent. of the moving power. In tail-rope haulage, when an engine is pulling a train of cars along a level, the effective power is 40 per cent. of the moving power.

Sulphur in coal occurs in three forms—hydrogen sulphide, sulphate of the alkali of earth, and pyritic iron. Hydrogen sulphide can be removed in coking; sulphur in sulphate form cannot be eliminated by coking as it goes with the ash; the sulphur in pyrites is partly removed by washing, partly by coking, and the remainder goes with the ash.

An experienced mine manager in a Western State is credited with the assertion that electric mine lighting does not bring compensating results, in that it fosters idleness rather than industry on the part of the men in the ground. For this reason it has been decided to remove all electricity from under ground at the mines controlled by this engineer, supplanting this modern light with the old-fashioned miners' oil lamp, worn on the hat.

The following is the average cost of three different mechanical haulage systems at four English collieries; the figures given include wear and tear of ropes, cars, grease, oil, steam and all necessary repairs to engines; also the cost of labor and depreciation of plant are considered:

Tail-rope haulage, 1800 tons per day, 3.914c. per ton-mile.
Endless-rope haulage, 1080 tons per day, 5.262c. per ton-mile.
Endless-chain haulage, 1940 tons per day, 2.877c. per ton-mile.

In studying the action of a gob fire, the process of oxidation may be illustrated by powdering some coal in a fine condition, moistening it, and leaving it in a heap until it becomes warm. If some of the coal is then placed in a tube and air allowed to pass through it very gently, it will become warmer. If the flow of air is now increased, the coal will become hot, and if the air current is considerably increased, vivid combustion will ensue.

Turbine pumps are becoming more popular in the anthracite coal fields. These pumps are directly connected to an electric motor. The advantages of using this kind of a machine are: First, small initial cost for installation of plant; second, less space is occupied and a smaller amount of oil and attention is required. A 120-h.p. motor with 500 volts will discharge 700 to 750 gal. of water per min., against a hight of 375 ft. The cost of installing such a plant is approximately $4000.

The fall of roof and sides in a coal mine is largely due to the action of the atmosphere. This is caused by the moisture in the air being condensed on coming in contact with any strata colder than the mine atmosphere. The action is greater in shallow mines than where the seam is deep, for the reason that the surrounding strata in shallow workings are much colder than in deep mines. The greater amount of vapor contained in the atmosphere in the summer months also makes these accidents more frequent during that season.

In robbing coal pillars when the roof is strong, the most successful method is to employ two or more sets of men working at one time, so as to draw the pillar as quickly as possible. If the roof is strong and the pillar is worked out slowly, the weight often breaks a number of props, which result in unnecessary loss. With a bad roof the pillars should be taken out in lifts from the top end, as this keeps the weight from coming on the drawing roads and causes less expense to keep them in repair. The last 20 ft. of the pillar should be worked from the entry, working outward until finished.

English mine managers have shown great reluctance in substituting mining machines for the older system of pick mining. The results of this backwardness is best illustrated by the following figures: During 1905, approximately 350,000,000 tons of coal were mined by 626,000 men in the United States; during this same year Great Britain employed 847,000 miners to produce 260,000,000 tons of coal. In 50 years the output of coal in the United States has increased from ¼ ton per head of population of over 4¼ tons; this increase of output, however, has been attended by an increase in the accident rate.

Experiments made by J. E. Dowson, with reference to the relative efficiency of gas and steam, show interesting results. The comparisons were made on a steam plant and a producer-gas power plant, each of 250 horse-power capacity. In the case of the steam plant, he found that of 1120 heat units contained in the fuel, 224 units are lost in radiation, flue gases, ashes, etc., and that 896 units appear in the steam that is generated. Of this amount **112 units are lost by** condensation in **the pipes, etc.**, leaving 784 units that are supplied to the engine. Of these, 667 units are lost in the exhaust, leaving only 117 units to be converted into work in the engine. Of these, 17 must be deducted for engine friction, leaving only 100 units, out of 1120 originally in the fuel, available for useful work on the engine shaft. A similar investigation of the producer-gas plant shows that there need be only 525 heat units in the fuel consumed in the producer to give 100 heat units of useful work on the engine shaft.

Metallics

The first thing to do upon finding a missed hole is to pull the fuse out of the charge, for the fuse may be only hanging fire. A person should never go back to a missed hole in less time than half an hour after the hole was spit.

A miner should have plenty of time to load and cut his holes, for the value of the day's work depends upon his blasting his holes properly. When holes are loaded hurriedly, a stick of powder may get hung up in a hole. Besides, many missed holes result from their being loaded in a hurry.

In many square-set mines the line of set above the drift, on the first floor, is kept open as a storage place. In case that the timbers are lowered into the stope, as they should be instead of being hoisted as is too prevalent a custom in mines, one or two sets at the top of each raise should be kept open for storage purposes.

Shaft ladders rarely wear out, but their rungs are sometimes broken by rocks, etc., falling down the shaft. Owing to the infrequent use, vertical latters are quite justifiable in shafts, although in some countries inclined ladders are made obligatory by law. Frequent stations or platforms should be placed in the ladder compartment so as to break the fall of falling objects.

In wet raises, where the copper or acid water rapidly corrodes iron, ladders with round rungs placed through auger holes in the uprights should be used. In case ladders with the rungs nailed are used, these should be fastened with copper nails. All shaft ladders should have round rungs. These may be made from gas pipe, but better from some hard wood; water in shafts rapidly eats away iron, but oak resists water and lasts a long time.

The size of tank in electrolytic copper refining is chiefly a matter of construction. The number of electrodes placed in parallel does not seem to bear any direct relation to the current efficiency. This is probably because low efficiency is caused rather by the condition of the deposit or its tendency to sprout and form trees than by local mechanical troubles between single pairs of electrodes. Sixty electrodes in a single multiple tank give no trouble.

When splicing mine ladders they should be sawed so that the distance between the rungs at the joint is the same as elsewhere. This distance between rungs should approximate 10 in. in vertical ladders. Generally in ladders in mines west of the Rockies uprights are made of 2x4-in. scantlings notched an inch deep to receive the rungs, which are of 1x2-in. or 1x3-in. stuff. The distance between uprights is generally from 12 to 14 in. in the clear.

While the cause of some missed holes is a defective cap, and still more frequently a defective fuse, imperfect in manufacture or injured by tamping, a missed hole sometimes occurs when a fuse is used which is slightly damp but which appears to be in good condition. A slight deadness in the spitting of the fuse should always make one suspicious. The misfire resulting from such slightly damp fuse is due to the fact that the heat of the burning fuse drives the moisture further along the fuse, until finally the increasing moisture retards the burning of the powder and finally may even put it out.

In determining the treatment charge on the ore purchased, the zinc smelter starts with the cost of smelting a ton of the ore of average composition, that is to say, the mixture on which he proposes to operate his furnaces. It is aimed to have all the furnaces on the same charge, for various reasons. To this smelting charge he adds the profit that he ought to make to obtain a proper interest on his investment, allowing for the necessary amortization of his outlay in plant. The further addition of the freight on the ore to his works, and on the spelter product to its market, with allowances for the cost of buying the ore and selling the spelter, gives the returning charge which he must make against the ore in buying it on the basis of f.o.b. cars at the mine or mill where produced.

The supply of steel can conveniently be kept in a special box having different compartments for starters, seconds, etc., while one large compartment is kept for dull steel. This box should be placed near the manway where the steel is lowered or hoisted into the stope. This box has only the bottom 8 or 10 in. inclosed. Above that the partitions extend, but the front is left open, so that the miner can readily select the different lengths required. This box not only encourages an orderly storage of the drill supply, but it also saves much time, which is wasted when a miner has to go through a pile of many different lengths of steel to find those approximately the length desired. At the Daly-West mine, Park City, Utah, a box similar to the one described is used on each level for storing machine steel.

Various "dopes" have been tried for controlling the character of deposit in electrolytic copper refining. Ammonium sulphate exerts a beneficial effect in encouraging smooth deposits. This may be due to some secondary cathode reaction in which the ammonium radicle is momentarily freed. Ammonium sulphate increases the resistance of the solution, however, by driving back the dissociation of the free sulphuric acid present. Organic reducing agents, notably gelatin, have marked effect in restraining the crystalline nature of deposits, but are not easily controlled in copper solutions. The peculiar structures sometimes seen at the cathode are doubtless due to the effect of various soluble impurities in the anode. Often a total change in the character of a deposit can be induced by simply lowering or raising the temperature of the electrolyte.

The value of a zinc ore depends chiefly upon its tenor in zinc and objectionable impurities; especially iron, manganese and lime, which increase the corrosion of the retorts; and lead, arsenic and antimony, which contaminate the spelter. The value of the ore is also affected by its character, whether oxidized or sulphide, or a mixture of both; the sulphide ore must be roasted, but yields a diminished weight for the subsequent treatment, which is the more expensive part of the process; the oxidized ore escapes preliminary treatment, unless it be carbonate, but suffers no diminution in weight. The preliminary treatment of ores which are mixtures of sulphides and oxides is often troublesome. The value of an ore is, moreover, affected by its physical character. Lump ore is subject to an additional expense for crushing; fine slimes are more expensive and troublesome to roast than coarser concentrates. Some ores roast and distil easily, others with more difficulty. All these factors are given consideration by the zinc smelter. The chemical composition of the ore is, however, the most important factor in determining its value.

The question of current density to be carried in electrolytic copper refining is largely one of power cost. Present American practice runs all the way from 12 to 35 amp. per sq.ft. The steady full load on a large power-house gives ideal conditions for the generation of cheap steam power. With high current density the tank room requires much closer supervision, as there is a greatly increased tendency toward polarization. It is customary to circulate the electrolyte from tank to tank to maintain uniform composition throughout. If this were not done the heavy liquor from the surface of the anode would form a horizontal layer of increased specific gravity at the bottom of the tank. Different strata would then have different conductivities, crystals of blue vitriol would form on the bottom edge of the electrodes and the operation of the tank be thoroughly disorganized. The higher the current density the greater this tendency and the more active must be the circulation. An excessive circulation tends to stir up the silver mud and results in an increased silver loss in the cathodes. Roughly, the silver contents of the cathodes made at a density of 30 amp. per sq.ft. will be double that of cathodes made at half the density. High current density also means rougher deposition and necessitates more frequent renewal of the cathodes to maintain the current efficiency. Most of the Eastern refineries run at from 17 to 20 amp. per square foot.

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Progress in the Science of Ore Deposits

In looking over a back volume of the JOURNAL, our attention was recently attracted to an article in the issue of Dec. 7, 1901, which described a cyanide plant in course of erection at the Chainman mine, Ely. Nev. Only five years ago that district, which had been known since the 60's, was still regarded as a low-grade gold mining district, and efforts were being made to operate by improved methods the mines, which as gold mines had been failures for more than 30 years. The original exploitation for gold of districts which subsequently became famous for great ore deposits of baser metals is no new thing. Mining began in that way at Leadville, Colo., at Bingham, Utah, and elsewhere. However, no one dreamed five years ago of the immense deposits of copper ore which underlaid the lean, copper-free gold ore of Ely. That discovery was analogous to the nearly contemporaneous discovery that the great bodies of gold ore at the Mount Morgan mine, in Queensland, Australia, were also underlaid by immense deposits of copper ore. These discoveries, to our mind, are of more far-reaching importance than the development of their own supplies of copper, inasmuch as they lead to a knowledge of new facts in the science of ore deposits which perhaps will be of immense value. History presents numerous precedents.

Although the discovery of ore deposits is chiefly fortuitous, the progress in the science of economic geology has greatly improved the ability of the prospector to prosecute successfully his search for ore, and of the miner to estimate the value of his discovery. For example, the discovery of rich silver ore at White Pine, Nev., in a limestone formation was the prime cause of redirecting attention to the mineralization of the same kind of rock at Eureka, Nev., and ever afterward prospectors looked especially for great deposits of lead ore in limestone formations; not that limestone had not previously been known as a kindly rock for the deposition of lead, but that it remained for the discovery of the Eureka bonanzas to impress the fact on all minds. Similarly, the discovery of gold in the andesite and phonolite of Cripple Creek, Colo., in 1891, right in the shadow of Pike's Peak, a district that had been overlooked by prospectors since 1859, led directly to the rich discoveries at Tonopah, Goldfield, and Bull Frog, about 10 years later. Previous to 1891 American prospectors did not know that gold occurred in the andesite class of rocks. The "heavy" rock that led A. B. Wood to the discovery of the carbonate deposits of Leadville doubtless troubled the placer miners of old Oro from the very beginning of their operations in 1860. Where was the prospector of 1880 who would not have identified it?

Now we conceive that the discoveries at Ely and Mount Morgan are likely to prove of a similar epochal character. Attention will be redirected to deposits of lean gold ore and drill holes will be put down through them to discover if they be underlaid by copper ore, while after the experience at Mount Morgan no manager of a gold mine of similar occurrence will be safe until he has prospected the bottom of the deposit. In cases where the geological conditions are similar to those at Ely and Mount Morgan, prospecting of this character will be likely to develop the existence of similar deep deposits of copper ore. It is the function of the mining geologist, whose importance in the economics of mining is now well recognized, to study the conditions with a view toward such similar prospecting. It is immaterial as to whether this last discovery was first made at Ely or Mount Morgan. Its scientific importance is that in two cases great deposits of copper ore have been found under extensive bodies of gold ore, one of good grade, the other of low grade, neither of which at the surface or even at moderate depth, showed any indication of copper that would attract more than casual attention. It is in the deduction of generalizations from such new discoveries and their application to future prospecting that the mining geologist becomes the guide of the prospector and the mining engineer.

Dredge Mining Troubles in California

The controversy between the dredge miners on the one hand, the farmers of the valleys, the Anti-Débris Association, and others inimical to gold mining, on the other, is increasing in bitterness and bids fair to result in as much acrimonious de-

bate as did the hydraulic mining question in California. Several millions of dollars have been invested in dredge mining, and several millions of dollars of new gold are produced by it each year. But there are those who are opposed to it, and will do what they can to have it restricted according to their ideas, or even, if possible, put under the ban entirely. A legal contest is bound to come shortly. The recent unprecedented floods throughout California, caused by heavy and continued rainstorms, were not confined to any one locality; but in those localities where dredges are extensively operated, especially near Oroville, in Butte county, Marysville, in Yuba, and Folsom, in Sacramento county, the local damages have been attributed entirely to the dredge system. This is unproved, of course, but the men whose property has been damaged evince a strong desire to begin a fight against the dredges, and, in fact, have already begun it. The newspapers of the valley, which formerly fostered the prejudice against hydraulic mining, now argue against the dredges. The moribund State Anti-Débris Association sees an opportunity for a renewal of its former influence, and a chance to fatten on the differences between two antagonistic industries. An organized effort is being made to force the dredge men to impound their débris or to cease operations. As a matter of fact the dredge men put nothing into the rivers that was not there before, though they turn over the land, and they dump their débris into the pits behind the boats which float the machinery. Yet all the silt, mud and débris which is carried down by the rivers at times of flood is laid to their operations. It will be but a short time before the matter will come up in the courts, inasmuch as those damaged, especially below Oroville, are taking steps for a legal adjudication of the trouble.

A British Goldfield

Recently there has been considerable talk in mining circles in London of the discovery of a so-called "English Rand;" a deposit of gold-bearing conglomerate similar to the great banket bed of the Transvaal. More has been said, however, in the daily press, than by mining engineers, which involves some suspicion of the promoters. Nevertheless, the promoters have succeeded in raising a considerable amount of working capital, and propose soon to begin operations.

A great mystery has been made over the whole affair and not even the location has been divulged. Our London correspondent, however, has learned that the scene of operations is in the Forest of Dean coal district in Gloucestershire, which is not many miles east of the South Wales coalfield. The bed is a conglomerate which occurs above the Old Red Sandstone and below the mountain limestone. It is supposed to be the sedimentary deposit formed by the débris brought down from the still older formations in Wales. The promoters, who call themselves the Chastan Syndicate, claim to have conducted a considerable number of tests of the outcrop, and state that all the samples show gold, the contents varying from $0.25 to $5 per ton. It is not said what proportion of the samples give 25c. and what $5. The surmise is naturally that the majority lean toward the former result, inasmuch as the promoters hope that other portions of the bed may be richer than what has yet been examined. Probably no great attention will be bestowed upon this new discovery until it has been reported upon by experienced engineers. In the meanwhile we advise investors to be cautious.

The Flotation Process Litigation

A statement by the chairman of the Broken Hill Proprietary Company, at its last semi-annual meeting, throws the light that has been waited for upon the recent litigation between the owners of the Potter process and the Proprietary Company, the latter having been sued on the ground that the process invented by G. D. Delprat, general manager of the Proprietary Company, and employed by it, was an infringement of the Potter process. After the hearing of lengthy evidence on both sides, the judge gave a verdict in favor of the Broken Hill Proprietary Company, on the ground of want of utility, the plaintiff's patent claiming to treat all ores and to use all acids, which it was not capable of doing.

This is another example of the importance of retaining a first-class lawyer for drawing the specification and claims of any patent that promises to be of importance, and associating with him one or more consulting engineers to advise as to technical points. The cases are too many where the patentee of an important invention, which has proved to be of great value in the world's industrial progress, has failed to reap commensurate benefit from it; indeed the inventor of such a process is lucky if he obtain any benefit at all. The patentee of an invention of small, or only moderate importance, is the only one who is comparatively safe, his safety depending upon the chance that it is not worth the while of any one to infringe his patent. On the other hand, a process patent of revolutionary character is particularly unsafe.

The MacArthur-Forrest patents on the cyanide process are a case to the point. The cyanide process has been of immense importance in the treatment of gold ore. but its fathers derived comparatively little advantage from it. In the most important of the recent metallurgical litigations in the United States, namely with respect to the Brown roasting furnace, its patentee was finally defeated by an ingenious evasion of his claims, for which there was a loop hole. With respect to the flotation processes in which an acid bath is employed, no engineer will question that C. V. Potter was the real inventor, but unless he is more successful in the trial of his case on appeal, he will lose his patent rights because of unwise legal advice in the drafting of his claims. His only satisfaction then will be the knowledge that the engineering profession will credit him with being the real discoverer of a process that has proved to be of great industrial importance.

Anthracite Mine Inspection

There is a constant agitation and demand for improvement in the anthracite mining laws as well as the system of inspection. This condition is principally due to the fact that there has been no well-based legislative revision of the existing laws since their original passage. The mine-inspection service in Pennsylvania may be generally assumed to date back to the passage of the law of 1870, which applied to the whole of the anthracite region.

Although the laws passed in 1870 represent the first important legislation bearing on the operation of these mines, there was an inspection act approved for the county of Schuylkill in 1869. This law, and the

first reports under it, are of special historical interest as being the first examples of coal-mine inspection in the United States. The passage of the Schuylkill law was a direct result of a strike for an eight-hour day in Schuylkill county in 1868, which was brought to the attention of the legislature by a petition sent in from that county.

The first general law was remedial and not preventive, being brought about by the disaster at the Avondale colliery of the Delaware, Lackawanna & Western Coal Company, near Plymouth, on Sept. 6, 1869. This accident, which was really the first great disaster in American coal mining, was the result of a partition in the shaft, between the intake and the upcast, catching fire from the ventilating furnace. The fire was communicated to the breaker situated directly over the shaft, and the smoke and gases were carried into the mine, causing the asphyxiation of the 108 men employed underground.

In 1885 the first anthracite laws were revised in accordance with the regulations of a commission appointed by the governor, consisting of six miners, three operators and six inspectors. One of the provisions was the establishment of a system of certificates for mine foremen. In 1889 an act was passed requiring each miner to show a certificate based upon two years' experience in mining before he would be allowed to work as a miner in the anthracite region. The last revision of the anthracite law occurred in 1891. It was expected that the present legislature would take up the matter and have a commission appointed to recast the entire law, but little effort in that direction has so far been exerted, and all of the present deficiencies continue to exist. Certainly a thorough revision of the anthracite law is needed, and the coal miners of the region should give earnest attention to the matter of securing it.

California Mining Prospects

Three counties of California are attracting especial attention. These are Inyo, Shasta and Sierra. In Inyo county the Greenwater copperfields which are new, and other camps which are old, but are being revived, are much in the public eye. Up to date the values are mostly prospective, for railroads and smelters are needed, but both are projected or being built. Shasta county has made good with its magnificent copper properties, and more of them are being rapidly brought to a productive stage. With several smelters of large capacity in operation the metal output of the county already makes a fine showing, but this is to be supplemented by mines now being developed and smelters being built. Sierra, one of the highest mountain counties, has been a laggard, as it has badly lacked capital and suitable means of transportation. The hydraulic mining difficulties of a quarter of a century ago closed down hundreds of its mines and caused a decided loss of population. Now, however, certain districts are again coming to the front, capital is being invested, and several of the old mines are being reopened with favorable prospects. The gravel channels of the county have not been half exploited, and the quartz mines have never been given sufficient attention.

Some of the other counties of California are unable to congratulate themselves as much as these mentioned. In Amador the mining population is decreasing. In the northwestern counties there are not enough miners to do the necessary work. In Calaveras, strikes have closed down a number of productive mines. In Tuolumne strikes are impending and investors are shy. In Nevada county, however, the largest gold producer of all, the labor troubles have been temporarily settled and there is a distinct revival of interest in all branches of mining.

The desert regions of the southern portion of the State are being vigorously prospected by large numbers of miners and hundreds of new mines are being developed in all directions. The prosperous new mining camps of Nevada are, however, attracting many miners away from California; and are attracting capital away also. Not so many new properties are being opened in the older mining counties of California as might be worked, yet it is not probable that the gold yield will show much falling off during the present year unless the Mother Lode counties suffer temporary set-backs through strikes of miners.

Imagination and Mining

An active imagination is a necessary part of an engineer's equipment, but it must be kept well in hand. When the fancy becomes too exuberant it may lead to unpleasant results. Despatches from Denver recently announced the arrest of a mining engineer, charged with having reported that a certain property in New Mexico, said to show nothing more promising than an old cave, contained "mountains of untold wealth," and "millions of tons of ore in sight, all ready for shipment."

This engineer's imagination apparently got beyond control. Every mining man gifted with powers of that sort ought to have some means of letting off pressure. Even then, the excessive activity produced by association with mines and mining may not be sufficiently reduced. Take the case of the author of "Baron Munchausen." He seems to have left but a poor reputation as a mining engineer, in spite of his efforts to work off his surplus fancy elsewhere. The following is from a letter by Bennett H. Brough, secretary of the Iron and Steel Institute, in a recent issue of the *Mining Journal,* London.

"Your Cornish correspondent suggests that the author of 'Baron Munchausen' ought to have been a mining engineer, and written reports. As a matter of fact, Rudolph Eric Raspe, the author in question, did pose as a mining engineer, and victimized his contemporaries with his reports. Some years ago, when preparing a paper on the first Institution of Mining Engineers (*Trans.* Inst. M. E., Vol. XVII, pp. 2-13, 1899), of which Raspe was a member, I endeavored to collect some particulars of the career of this remarkable character. Briefly, they were as follows: He was the author of numerous scientific works, including an account of some German volcanoes in 1776; he translated the works of Ignaz von Born and J. J. Ferber. Born in 1737, he was educated at Göttingen and became curator of the collection of coins at Cassel, where he appropriated 2000 dollars' worth of medals. He was hunted over Germany, being captured at Clausthal, when he escaped to England, and was for some years storekeeper and assayer at Dolcoath mine in Cornwall. There he wrote 'Baron Munchausen.' Subsequently he was mixed up in some unsatisfactory prospecting in Scotland, and victimized a Highland proprietor. The incident furnished the material for Sir Walter Scott's Dousterswivel in "The Antiquary." He died in 1794, having sought refuge in the north of Ireland."

Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice or Suggested by Articles in the Journal, and Inquiries for Information

CORRESPONDENCE AND DISCUSSION

Utilization of Black Sand

I have taken particular pleasure in reading your interesting editorial upon "The Utilization of Black Sand" in the JOURNAL of April 13. As one who has had considerable experience in the treatment of black sands, I wish to accept the general invitation extended in your article and contribute a few words upon the subject.

In the first place, I desire to heartily endorse the idea as expressed in your editorial, that the vital and as yet unsolved problem, on which the success of the enterprise depends is the economical collection of the black sand, with its accompanying gold and platinum metals, in a low-grade concentrate. The primary operation in any successful scheme of treatment must be the obtaining of such a product.

The secondary operations, namely, the concentration of this first product, followed by the separation and extraction of the valuable ingredients, are matters which have already been satisfactorily solved. In fact, these latter steps in the process are in no way problematical, satisfactory procedures having been devised both by the U. S. Geological Survey in its investigation of the matter under the direction of Dr. David T. Day, and by private enterprise. The main problem, however, has received very little attention.

COLLECTING THE SAND

What seems to be needed is some practical mechanical device or series of devices that can be applied to a sluice-box or installed on a dredge, that will be capable of making the low-grade concentrate already referred to. While I am acquainted with various patented apparatus which claim to save black sand as part of their field of usefulness, I have as yet failed to find one able to recover the sands on the large scale required and at the same time remain practical from a commercial standpoint. Further, I do not believe that there is any device on the market which meets these demands.

To invent and thoroughly test some apparatus which shall satisfactorily fulfil the requirements is a matter which calls for experimentation. The ordinary placer miner cannot afford to try experiments along any line and the larger companies with the necessary financial backing hesitate to undertake a work where the benefit from results could not be kept within their own grasp. The fact is, that where the results are of such wide interest, the benefit derived from successful experimentation would be shared almost equally by the individual or concern who conducted the experiment and by the outsider. For these reasons, a satisfactory investigation of the matter by private enterprise is practically precluded and black sand mining will continue to be classed as a failure unless the U. S. Geological Survey continue the investigation it has so satisfactorily commenced.

U. S. SURVEY SHOULD CONTINUE THE WORK

I do not think that your argument that the investigation is now outside the scope of the Survey's work is at all well taken. I agree with you fully when you say that "It is an engineering problem rather than a geological or metallurgical," but cannot see how the fact that the question is "distinctly of an engineering character" removes it from the field where its solution can be legitimately undertaken by the Survey. Is the treatment of sands in a sluice-box classifier, for instance, any more of a mechanical or engineering problem than the treatment of the same sands on a concentrating table or magnetic separator?

In my estimation, the work which the Survey has already accomplished in its investigation of the matter has embraced more than one strictly engineering problem; for example, is not the determination of the best and cheapest method of elevating, screening, concentrating and drying sands something that might be classed in an engineering line? If it is within the province of the Survey to start the work, why should it not be allowed to carry the matter to a successful termination and take the glory of the accomplishment? The honor would be no mean one, for the work is of as widespread interest and as capable of as great benefit to the people as a whole as any work the Survey has yet undertaken.

In concluding, I wish to say that from my own observation I can see no reason why the Survey, which can command the best engineering talent in the country on the question, if necessary, should find any difficulty in bringing an investigation along these lines to a successful issue. For one (there are hundreds of other miners who have the same feeling in the matter), I should like to see the Survey undertake the work. FREDERICK W. HORTON.

Portland, Ore., April 22, 1907.

The question whether or not it would be wise to ask the U. S. Geological Survey to carry its investigation of black sands to the conclusion suggested will be discussed in a future issue of the JOURNAL.

Galvanized Sheets for Fire Protection of Bridges

An experiment on the Northern Pacific Railway promises to increase the market for heavy galvanized sheets and spelter. It consists of the use of such sheets for the decks of wooden bridges to guard against fire. A large percentage of railway bridge destruction by fire, comes from live coal cinders from the ash pans of the locomotive.

There is a great volume of air, under high wind pressure always rushing between the bottom of the ash pan and the grates of the firebox. The momentum of speed creates a fierce draft which often sweeps live coals out to the road bed. If a section of the latter happens to be a wooden bridge, it receives this live coal, and in very dry weather, a fire is often the result. Most of the wooden bridge conflagrations are due to this cause. The wooden bridge is subject to danger from this source. It entails constant supervision by inspectors and watchmen, and is one cause of heavy expense, delays and wrecks.

The scheme has been in use on the Northern Pacific Railway for over a year, and is giving good results, in cutting down the expense in supervision and also in protection to the woodwork of the bridge structure. The sheets are put on in 8-ft. lengths, each lapping the other, riveted with copper rivets. The rivets are placed one foot apart so as to leave a space through which the drainage from rain and melted snow can drop through. The rails are laid on top of the sheets and spiked through. The bolts for the timbers also go through the sheets. On the ends of the bridge, the sheets are flashed under the first tie of the road bed, and no part of the wooden frame is exposed.

The section observed between Wallace, Idaho and Missoula, Montana, shows that the scheme is a practical one. In winter, the ice lies very loosely on the plate, and is subject to the slightest change in temperature. GEO. HUSTON.

Wallace, Ida., Apr. 2, 1901.

New Publications

THE ANALYSIS OF SILICATE AND CARBONATE ROCKS. By W. F. Hillebrand. Pp. 200; illustrated. 6x9 in.; paper. Washington, 1907: Government Printing Office.

MANUAL OF THE GEOLOGY OF CONNECTICUT. By W. N. Rice and H. E. Gregory. Pp. 273; illustrated. 6x9 in.; paper. Hartford, Conn., 1906: State Geological and History Survey.

ECONOMIC GEOLOGY OF THE BEAVER QUADRANGLE, PENNSYLVANIA (SOUTHERN BEAVER AND NORTHWESTERN ALLEGHENY COUNTIES). By Lester H. Woolsey. Pp. 132; illustrated. 6x9 in.; paper. Washington, 1906: Government Printing Office.

ELECTRICITY IN MINING. By Sydney F. Walker. Pp. 384; illustrated. 5½x9 in.; cloth, $3.50. London and New York, 1907: Harper & Brothers.

Contents: Definitions, Units, etc. Electric mining signals and telephones. Electric lighting for mines. The generation of electricty. Distribution of power by electricity. The application of electricity to driving machines, etc., in mines. Faults in electrical apparatus.

FIRE ASSAYING. A PRACTICAL TREATISE ON THE FIRE ASSAYING OF GOLD, SILVER AND LEAD, INCLUDING DESCRIPTION OF THE APPLIANCES USED. By Evans W. Buskett. Pp. 105; illustrated. 5x7½ in.; cloth, $1.25. New York, 1907: D. Van Nostrand Company.

Contents: Sampling. Reagents and fluxes. Assay of acid ores. Assay of base ores. Lead assay. Bullion assay. Methods of handling work. Laboratory tests. Appendix.

THE CONSOLIDATED STOCK EXCHANGE OF NEW YORK. By S. A. Nelson. Pp. 124; illustrated, 5x7 in., flexible leather. Price, $1, New York; the A. B. Benesch Company.

History of the Exchange; the Clearing House; the Gratuity Fund; Day's Work of a Commission Broker; Membership; Work of a Trader; Principles of the Consolidated Exchange; the Mining and Grain Departments; Glossary of Wall Street terms; Mechanism of a Complete Bear Trade; Mechanism of a Complete Bull Trade. The book refers to the Consolidated Exchange, which is distinct from the New York Stock Exchange, having a different membership entirely; it has always given more time to dealing in mining stocks than the older Exchange. It describes the career, methods, mechanism and machinery of a Wall Street institution that is more than 30 years old. It is appropriate that the publication of the volume comes at the time when the Consolidated is about to change its home from Broadway and Exchange Place to the new building on Broad Street.

The Labor Question in the Transvaal

SPECIAL CORRESPONDENCE

The general feeling on the stock exchange is almost one of dull despair. About 10 days ago, the citizens of Pretoria gave a public dinner to the new ministry. The speech made by General Botha was non-committal, but on the whole it was considered conciliatory and statesmanlike. He declared in general terms that it was not the intention of his ministry to do anything to damage the main industry of the country. He said that the chief thing this colony needed was rest and quietness.

Last week the first parliament of the Transvaal met in Pretoria. It was known that the session would be a very brief one, but the Progressive party and the mining community hoped that the Government would make a definite pronouncement on the unskilled labor question.

In the speech from the throne, the country learned that the Boers were determined to get rid of Chinese labor as soon as possible. They stated nothing definite about the immediate future and seemed indifferent to the serious state of affairs.

In June the contracts of the first crowd of Chinese coolies expire. Parliament will not meet again until June 14. What the opposition wanted to know was whether these coolies would be allowed to sign on again. But the Government refused point blank to make any statement on the labor question and the general feeling is that it will adopt the policy of drift. In spite of the eloquent protests of the Progressive leaders, who demanded that a commission be appointed to inquire into the question of unskilled labor, the Government used its big majority in the most ruthless fashion, and refused to allow discussion on the subject. Parliament ended its sitting without a pronouncement on the most vital question before the country, that of the supply of unskilled labor for the mines.

The mining community feel rather blue at the outlook. The Boers stated that their party would do nothing to injure the mining industry, but the suspense and apprehension caused by their policy of drift will no doubt bring on a panic, and add to the already heavy load of distress the community has to bear. So uncertain of the future are the merchants that they dare not order any large stocks. Developing mines will not go forward with work.

The Boers reply to the threats and warnings by stating that there is any amount of Kafir labor to be obtained in the country. Perhaps 40,000 Kafirs could be obtained, to work for three months, but at the end of that period they would go home for a year. It is utterly impossible to carry on an industry such as this, with an erratic supply of labor.

The yearly report of the French Rand mine shows what excellent work is being accomplished with Chinese labor. For 1906 the company made a profit of £50,657, compared with about £18,000 for 1905. A much larger tonnage was crushed with fewer Chinese than in the previous year. The working costs show a reduction of 58.6c. per ton milled. The improvement was due to the increased efficiency of the Chinese.

Mineral Production of New York State in 1906

Through the courtesy of D. H. Newland, assistant State geologist, we are able to present the following statistics of the mineral production of the State of New York in 1906:

MINERAL PRODUCTION OF NEW YORK IN 1906.

Product.	Unit of Measurement.	Quantity.	Value.
Portland cement	Barrels.	2,423,374	$2,766,488
Natural rock cement	Barrels.	1,691,565	1,184,211
Building brick	Thousa'ds.	1,600,059	9,688,289
Pottery	.....	.....	1,795,008
Other clay products	.....	.....	2,472,003
Crude clay	Short tons.	5,477	9,125
Emery	Short tons.	1,307	13,870
Feldspar and quartz	Long tons	13,660	44,350
Garnet	Short tons.	4,729	159,298
Glass sand	Short tons.	9,000	8,600
Graphite	Pounds.	2,811,582	96,084
Gypsum	Short tons.	264,581	685,053
Iron ore	Long tons.	905,367	3,393,609
Millstones	.....	.....	22,442
Metallic paint	Short ton	2,714	29,140
Slate pigment	Short tons.	2,045	15,960
Mineral waters	Gallons.	8,000,000	1,000,000
Natural gas	1000 cu.ft.	3,007,086	766,579
Petroleum	Barrels.	1,043,088	1,721,095
Pyrite	Long tons.	11,798	35,550
Salt	Barrels.	9,013,993	2,131,650
Roofing slate	Squares.	16,248	57,771
Slate manufactures	.....	.....	4,150
Sand lime brick	Thousa'ds.	17,080	122,340
Granite	.....	.....	255,189
Limestone	.....	.....	2,963,829
Marble	.....	.....	460,915
Sandstone	.....	.....	1,976,829
Trap	.....	.....	847,403
Talc	Short tons.	64,200	541,600
Other materials*	.....	.....	1,850,800
Total value	.....	.....	$37,118,430

*Includes apatite, arsenical ore, carbon dioxide, diatomaceous earth, fullers earth, marl, and sand and gravel, exclusive of glass sand.

Arsenic is the most difficult impurity with which to deal in electrolytic copper refining. If much is present in the anode, say over 1 per cent., it rapidly accumulates in the solution and necessitates a large expenditure for purifying to hold it down. With small quantities it seems to slime more rapidly and no purifying is necessary. With other conditions properly cared for, satisfactory cathodes can be produced in an electrolyte running 2 per cent. arsenic, though this is considerably above the customary figure.

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

J. B. Tyrrell, of Toronto, is in Cobalt, Ont., sampling and valuing the Right-of-Way mining properties.

E. Percy Smith is now superintendent of the Minas Dolores y Anexas, at Matehuala, San Luis Potosi, Mexico.

Richard Linthicum, editor of the *Rico News*, of Rico, Colo., was a recent visitor to New York, where he has been attending to mining business.

H. C. Booth is appointed superintendent of the Indian Territory mines of the Rock Island Coal Company, with headquarters at Hartshorne, I. T., in place of Edward H. Coxe, who has gone to Alabama.

Edwin C. Holden has entered the firm of Hill & Irvine, mining engineers and geologists, New York. The firm is now Hill, Holden & Irvine, the members being Robert T. Hill, Edwin C. Holden and Frederick B. Irvine.

J. S. Watson, manager of the Link-Belt Company's drive chain department, sailed for Europe on the "Amerika," April 25. While abroad Mr. Watson will visit the chain-making plant of Hans Renold, at Manchester, England.

Johan August Brinell, of Stockholm, Sweden, will receive the Bessemer gold medal for 1907 at the meeting of the Iron and Steel Institute, in May, chiefly for his researches on the changes in texture on heating and cooling steel.

T. B. Bassett has resigned his position as general manager of the Belen Mining Company, near Cumpas, Sonora, Mexico, to take effect June 15. Mr. Bassett will again enter into general practice as a mining engineer, and has engaged to do some professional work in the northern part of Sonora.

John W. Seaver, who with S. T. Wellman and the late Charles H. Wellman, formed the Wellman-Seaver Engineering Company, at Cleveland, Ohio, about 10 years ago, and for several years has been a vice-president of the Wellman-Seaver-Morgan Company, has resigned his position. He has opened offices as consulting engineer in the Caxton building, Cleveland, and will devote himself to the design and construction of manufacturing and power plants, iron and steel foundries and machinery for handling material.

Obituary

William J. Johnston, who was president of THE ENGINEERING AND MINING JOURNAL, INC., from 1902 to 1904, died at his residence in New York, April 29, aged 54 years. He was born in Ireland and came to this country when 15 years old. After some work as a telegraph operator, he started a journal called the *Operator*, which subsequently developed into the *Electrical World*. After selling his interest in that paper he spent some time in travel, and then started *Mining and Metallurgy* in New York, which was later consolidated with this JOURNAL through the Johnston Publishing Company, of which he was president. He retired in 1904 and started the *Mining Magazine*, which he sold two years later to the Hill Publishing Company. He became owner of the *American Exporter*, of which he was publisher up to the time of his death. Mr. Johnston had a thorough knowledge of the publishing and advertising business, and was successful in several of his ventures. He leaves a widow, four sons and two daughters.

David Willcox, whose resignation as president of the Delaware & Hudson Company was recently noted, killed himself, April 24, while on board the steamer on his return to this country from a trip to Europe, undertaken for the benefit of his health. He was 57 years old, having been born in Brooklyn in 1850. After graduating from Yale College and the Columbia Law School, he began the practice of law in New York in 1874. He was engaged largely in corporation practice, and later became counsel for the Delaware & Hudson Company. For a number of years he was at the head of that company's legal department as its general counsel. In 1903 he was chosen president of the company, a position which he held until two weeks ago, when he resigned on account of ill health. His legal training and thorough acquaintance with the trade made him prominent in the councils of the anthracite companies. At the time of the great strike in 1902-3, he appeared as their spokesman on several occasions. An able lawyer and pleader and a fluent writer, he was the author, in addition to his official documents, of pamphlets, magazine articles, etc., which were widely read, and made his name known to the general public. Mr. Willcox was never married; he was connected with many clubs and organizations in New York. He was a stockholder and director in the Union Pacific, the Southern Pacific and other railroad companies.

Societies and Technical Schools

Nevada Mining and Scientific Society—This society has been organized, with headquarters at Goldfield. Its object is to collect and publish reliable information about the mineral resources of Nevada. The society has elected officers as follows: President, J. W. Finch; first vice-president, Capt. J. A. Hassell; second vice-president, A. F. Price; secretary, F. J. Swears; treasurer, G. V. Burton.

Industrial

The Carnegie Steel Company recently ordered four 400-kw. Allis-Chalmers oil-filled, self-cooled power transformers for installation at the Carrie furnaces, Rankin, Pennsylvania.

Horace T. Frizelle, who was for several years connected with the Colorado Fuel and Iron Company, Denver, Colorado, has been appointed purchasing agent of the New York Engineering Company.

The San Francisco office of the General Electric Company is now permanently in the Union Trust building, in San Francisco. Since the fire, the office has been at Oakland, large temporary warehouses having also been erected in the same city.

Trade Catalogs

Receipt is acknowledged of the following trade catalogs and circulars:

American Locomotive Company, 111 Broadway, New York City. Mogul Type Freight Locomotives. Pp. 60, illustrated, paper, 6x9 in.

Wellman-Seaver Morgan Company, Cleveland, Ohio. Circular No. Ca-3. Mine Cages, Skips, Ore Cars, etc. Pp. 40, illustrated, paper, indexed, 6x9 in. 1907.

Construction News

American Falls, Idaho—It is proposed to build a smelter at this place. James H. Brady, Pocatello, Idaho, has charge of the project.

Nevada City, California—There is talk of putting up a matte-smelting plant at the Junction mine. T. A. Varden is superintendent.

Rough and Ready, California—This company will erect a mill and put in a pipe-line 1400 ft. long at the Ironclad mine. H. M. Black is superintendent.

El Paso, Texas — The Southwestern Portland Cement Company is preparing to establish a plant and will need machinery. A. Courchesne, El Paso, Texas, is general manager.

Peacock Mountain, Washington—A compressor plant is to be installed at the Salmon River mine. William McDaniel, Conconalli, Okanogan county, Washington, is in charge.

Nighthawk, Washington—Preparations are being made to put in power drills at the Little Chopaca mine. Charles A. Andrus is manager; address at Nighthawk, Okanogan county, Washington.

Bullion, Nevada—The Nevada Phœnix Mining Company is arranging to develop a mining property, and will need air-compressors, drills and other machinery. P. B. Locker, Salt Lake City, Utah, is president.

Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives at Denver, Salt Lake City, San Francisco and London

REVIEWS OF IMPORTANT EVENTS

San Francisco

The expected has happened and miners' strikes have suddenly closed down several important Mother Lode mines, including those of the Utica system, the Stickles, Lightner, Matson, Angels, Crystal and others at Angels, where between 900 and 1000 miners were employed. The miners are mostly Austrians, and there are about 900 members in the local union. The Utica, formerly and for some years the most productive gold mine in the State, and still a large producer, has taken the pumps out of the Gold Cliff and Stickles and suspended work in the main mine. The mill has been cleaned up, the windows stoutly boarded, and the powder at the mine removed. The entire works have been virtually closed down. The company, while a large gold producer, has been running behind of late, the grade of ore being only about $2 per ton. They have been paying miners $3 and muckers $2.50 per day for 10 hours' work, and to cut down to eight hours means too much loss. The men did not ask for an advance in wages, but wanted an eight-hour day. This the mine-owners refuse to grant. In the same county, without any notice, the underground men at the Penn Chemical Works, a productive copper mine at Campo Seco, refused to go to work under the prevailing schedule of 10 hours. The smelter men also joined in. The superintendent was unable to act without authority from the owner, H. Harmon, of Chicago. About 200 men were involved, but belonged to no union. The matter was finally settled by granting the underground men, mostly Italians, a nine-hour day, and increasing wages of the men at the smelter 10c. per day. At Sierra City, in Sierra county, rumors of a strike at the Sierra Buttes mine caused the discharge of 60 Austrian and Italian miners, but some 70 men are still at work there.

Salt Lake City

April 25—The construction of the Caliente & Pioche Railroad, between Caliente and Pioche, Nev., a distance of 30 miles, has begun. Contractors say the line will be completed in July. In the meantime the camps of Pioche and adjoining districts are active. Several deals have been made recently, the most important of which was the asquisition of the E. & F. mine, at Bristol, by W. A. Clark and associates.

Articles of incorporation of the Nevada Phœnix Mining Company, which will undertake the development of ground in the Bullion, Nev., district, have been filed. P. B. Locker, of Salt Lake, is president; John Janney, vice-president; Geo. Rust, secretary. Salt Lake is the headquarters of the company.

The headquarters of the Nevada Hills Mining Company will shortly be moved from Goldfield to Salt Lake, where a majority of the stock is held.

The Ohio-Kentucky Mining Company, operating at Pioche, has opened the Susan Duster orebody at 200 ft. depth. On the 100 level this orebody was crosscut for 30 ft. The vein contains a large amount of shipping ore.

Plans are being worked out looking toward a consolidation of the May Day and Uncle Sam Consolidated mines in the Tintic, Utah, mining district.

Shareholders of the Morrison Mining Company, operating in Humboldt county, Nevada, have changed the name of that corporation to the Imlay Copper Mining Company and have increased the capital stock from 400,000 to 500,000 shares. The headquarters will remain in Salt Lake City, as heretofore. G. W. Morgan is president.

The Moscow Extension Mining Company has been formed in Salt Lake City to operate a group of mining claims in the Star mining district in Beaver county. The incorporators are James M. Russell, Howard Russell, William Pischel, Robert B. Harkness and Frank A. Robison. All but the latter are residents of Salt Lake City.

James H. Brady, of Pocatello, is at the head an enterprise being formed for the purpose of building a smelter at American Falls, Idaho, where electric power is available.

Toronto, Ont.

April 27—The Ontario legislature has passed a bill, introduced as a government measure, validating the title of the purchasers of mining rights in Cobalt lake and Kerr lake. An action is now before the courts, brought by the Florence Mining Company against the Cobalt Lake Mining Company, claiming title to the location on the ground of prior discovery. The Government takes the ground that the claim of the Florence company has been already investigated and found not to be sustained. Amendments in the bill recognizing the right of the rival claimants to substantiate their claim in court, and, of sustained, to obtain compensation, were defeated.

A claim for the royalties collected by the Provincial Government on the output of the O'Brien mine, being 25 per cent. of the value of the ore mined, has been preferred by La Rose Mining Company. The royalty arrangement between the O'Briens and the Government was the result of a protracted lawsuit undertaken by the Government at the instance of La Rose interests, who claimed the location as the original discoverers. The matter was settled by the Government confirming the title of the O'Briens on condition of their undertaking to pay a royalty, and La Rose owners realized nothing. They now claim that the royalties, amounting to the present date to $54,406, rightly belong to them.

The town of Parry Sound has voted a bonus of $100,000 to the Dominion Smelters, Ltd., the company undertaking to commence this summer the building of a smelter to cost $1,500,000, which is to be finished within two years, and to employ 400 hands with a pay roll of $1000 per day.

London

April 20—Some months ago I referred in this column to the farcical promotion of a company intended to send a prospecting expedition to an unnamed island off South Africa, where it was alleged there were diamondiferous deposits. The whole thing was a failure, and for a time after Mr. Kenyon-Collis's name was not heard of in the city. This gentleman has now cropped up again with another diamond scheme. He has given up locating his mines in unnamed islands and has settled down instead on a property next door to a famous producer. His tract of land is the Vogelsfontein, and immediately adjoins the Jagersfontein, in the Orange River Colony. It is stated that a pipe of diamond ground has been opened up, and that the content of the ground so far treated has been 7 carats per 100 loads, which compares with 10 carats at the Jagersfontein. The promoter is making a big profit by the flotation, and takes care that his services as managing director shall be handsomely remunerated. The other directors, which number among them a few titles, such as general and baronet, make a great boast of their forbearance in not asking for any fees until a 10 per cent. dividend has been paid. The company starts with a big nominal capital, but far too much goes as purchase price, and too little as working capital. The company also has been able to afford a good editorial notice in one of the financial papers.

Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

THE CURRENT HISTORY OF MINING

Alabama

TUSCALOOSA COUNTY

Cypress Creek Coal—This company is organized with the following officers: W. E. Leake, Birmingham, Ala., president; W. G. Somerville, Tuscaloosa, vice-president; R. E. Rodes, Tuscaloosa, secretary and treasurer. The company has secured options on 3000 acres of coal lands on the west side of the Warrior river, about eight miles from Tuscaloosa, and will develop the property at once.

Arizona

YAVAPAI COUNTY

Dividend Mine—This mine has passed from the Dividend Consolidated Mining Company to the Mount Elliot Mining Company. This mine has a large amount of ore blocked out and development work well ahead. The new company will at once put on a force of men and work the property to its capacity.

Jessie Mines Company—It is reported that this company will increase its mill capacity 50 tons. On account of the developments in the mine it is impossible to treat all of the ore in the present mill.

Octave—This mine has passed from the ownership of the Octave Gold Mining Company, a close corporation, to the Octave Mining Company. The new company has made numerous improvements about the mine, mill and camp and will soon place the mill in operation. This mine is one of the large gold mines of Arizona, and at this time has large bodies of good milling ore blocked out. The property has been developed to a depth of 1850 ft. on the incline, making a vertical depth of about 900 ft. It is equipped with a modern plant of mining and milling machinery.

California

AMADOR COUNTY

Defender—From this mine, Defender, ore valued as high as $60 per ton has recently been taken out at a depth of 200 ft. The mill will shortly be started.

BUTTE COUNTY

Magnolia—E. R. Agersinger and others, of Goldfield, Nevada, have organized a company to work gravel mines at this place.

CALAVERAS COUNTY

Benson Mining Company—There has been some dissatisfaction with the conduct of affairs of this company at Angels and a new board of directors has been elected, who will put in a new president.

EL DORADO COUNTY

Big Cañon and Pyramid—J. B. Menardi, of Goldfield, Nevada, is investigating these properties with a view to purchase, if the ore tests are satisfactory.

Lamb—This hydraulic mine near Indian Diggings is again being worked, although but one nozzle is in use.

INYO COUNTY

Red Boy—In this mine, Greenwater, a strike of rich carbonate ore has been made at 250 ft., which is considered an encouraging sign.

Inyo Copper Company—This company has been organized by Chas. Wing, of Greenwater, A. Olson and Captain Horton, to develop copper and silver claims near Darwin.

KERN COUNTY

At Bakersfield a contract has been made by the terms of which the McKittrick oil producers have agreed to sell a large quantity of their product to the Associated Oil Company for 30c. a barrel.

MONO COUNTY

Standard Consolidated—This company at Bodie has bought the New Standard group, including the Agawan, Adirondack and Remmart claims.

NEVADA COUNTY

Gold Mound—This Spokane, Washington, company, which has been prospecting for some months on Deadman's Flat near Grass Valley, is now erecting machinery for extensive development work.

Belle Union—This mine, near Grass Valley, has been purchased by Grass Valley, Los Angeles and San Francisco capitalists. It has not been worked since 1872.

Orleans Mining Company—This company is about to disincorporate, the property having been sold to the Sultana Mining Company.

Junction—The first carload of copper ore has been shipped from this mine to the Shasta county smelters. T. A. Varden is superintendent. The company intends shortly erecting a smelter.

SAN BERNARDINO COUNTY

Copper—A discovery of high-grade copper ore has been made in the Ivanpah mountains, 25 miles northwest of Vanderbilt.

Colorado

GILPIN COUNTY

Gower Mines Syndicate, Ltd.—At a depth of 1350 ft. on the east side of Running Lode shaft, copper-lead ores have been opened up, carrying high values. T. Dunstone, Black Hawk, Colo., is superintendent.

Old Town Consolidated—A strike of copper ores is reported at a depth of 1800 ft. in main shaft, carrying high values in gold, silver and copper. G. K. Kimball, Jr., Idaho Springs, Colo., is manager.

ROUTT COUNTY

Antler Group—A. J. Smith, of Columbine, has sold to L. A. Stillwagon, of Glenwood Springs, Iowa, for a consideration of $20,000, this group in Little Red Park, near Hahn's Peak. Machinery is to be at once installed.

Hyatt-Verde Copper Company—A plant of machinery is to be installed on this property. G. I. Bratton, Steamboat Springs, Colo., is manager.

Helvey Ranch—Natural gas is reported to have been found on this property, and C. H. Rowlette, C. E. Bivens and others, of Steamboat Springs, have taken an option on the property and will determine the extent of the proposition.

Manganese Ores—A find is reported by H. S. Dougan, of Kremmling, an assay of outcroppings showing over 15 per cent. manganese.

LAKE COUNTY—LEADVILLE

Fairmount Group—South of the Mammoth work has been started sinking on the Fairmount ground; the shaft is 4½x9 in the clear, and will be sunk the first 50 ft. by windlass, when machinery will be installed.

First National—Water was the great drawback to the successful working of this property, Iowa gulch, a few years ago; a recent examination of the shaft proved that the water had been greatly lowered, and it is believed now that a small Cameron sinker will be able to handle the flow. A good body of zinc ore was opened before the property was closed down, and it is to develop this oreshoot that the property will resume operations.

Fryer Hill—Recently the tonnage of iron from this section has fallen off, but the shortage has been more than made up by the silicious ore that is being shipped from a number of properties. The leader among them is the Fitzhugh, which is

sending out 30 tons daily of high and medium grade material. The Matchless is shipping 25 tons daily of a good grade of lead ore, opened in one of the lowest levels. From the 200-ft. level of the Anderson lease on the Seneca, north, 15 tons daily are being shipped from an iron ore-body that carries considerable lead; a drift to the east has tapped the edge of another iron ore-shoot. From the 225-ft. level of the Robert E. Lee a good body of silicious ore has been opened, from which two carloads daily are being shipped. At the Dewar lease, on the Amie, a carload a day of good iron is being shipped from the 270-ft. level. From the Dunkin No. 3 and No. 4 shafts some good mineral is being shipped. The Little Silver has resumed operations. The old Chrysolite shaft is in such poor condition that it is no longer safe, and has been abandoned; it is likely that a new shaft will be sunk. A number of lessees are working over the dumps of different properties, hand sorting, and all are doing well.

Indiana

GREENE COUNTY

Calora Coal Company—This company, with offices in Jasonville, has put the miners at work on off days drilling a number of oil wells, and the several hundred acres of coal land owned by the company is dotted all over with derricks. In addition to its holdings, options have been taken by the company on 7000 acres of adjoining territory.

Kentucky

KNOX COUNTY

Matthews Coal Company—This company has taken over the Cumberland Company, having purchased the personal property and leased the coal plant, together with 834 acres of coal land, at Warren. It is intended to continue the operation of the plant, developing it to a capacity of 600 tons of coal per day. Officers of the Matthews Coal Company are: John G. Matthews, Barboursville, Ky., president; R. W. Cole, vice-president; H. W. Matthews, secretary; A. L. Matthews, treasurer.

Michigan

HOUGHTON COUNTY—COPPER

Atlantic—Sinking on section 16 shaft has reached a depth of approximately 350 ft. Work will be continued until the sixth level is reached, when a cross-cut will be extended to connect with a drift from the Baltic. This work is being done in view of bettering the ventilation in this shaft.

Calumet & Hecla—This company will install another 2000-kw. generator at the power plant at Lake Linden. The changing of the pumping station on Lake Superior to electrical power operation, and the erection of the large re-grinding plant, necessitate this additional electrical power.

KEWEENAW COUNTY—COPPER

Keweenaw Copper Company—The shaft on the Medora property is down 600 ft., and is bottomed in fine rock. A new hoist is to be installed at this shaft, and a second shaft started during the coming summer, also a shaft is to be sunk on the Empire tract. This company has secured control of the Phœnix Copper Company, and will start immediately to fully explore the lands. The acquiring of this property will give the Keweenaw all the stamp-mill facilities needed for some time, as the Phœnix has a well equipped mill, that can be put into operation with very little alteration, and shipments can be made from the stock-pile.

Montana

BUTTE DISTRICT

Boston & Montana—The company is now raising ore through the new four-compartment shaft on the Leonard, which, with improved transportation facilities, enables it to maintain its daily output of 3300 tons of ore. A surface haulage system operated by electricity has been installed on the Meaderville side, the point of several of its large producers. By it ore can be thrown into any of the bins from any of the mines on that side. Sinking is again in progress in the West Colusa and continued to the 2000 level.

Davis-Daly—Drifting east and west on the 500 of the Smokehouse is still in progress. The new electric hoisting engine ordered several months ago for this claim, has been delivered, but the motor has not arrived. The engine will lift 7000 lb. 1300 ft. at the rate of 600 ft. a minute. Sinking will be resumed in a month or six weeks, and continued from the 500- to the 1800-ft. mark. Sinking is going on in the Colorado, Mt. Moriah and Silver King shafts, and the face of the crosscut south of the 1800 of the Original is advancing 5 ft. a day. No ore in commercial quantity has been encountered in any of the workings of the company.

Parrot—Development is confined to the lower levels of the main workings adjoining Nipper ground. The daily ore production is about 300 tons.

Nevada

CHURCHILL COUNTY—FAIRVIEW

Fairview has developed rapidly, though at the present time has not the boom which is on in Wonder. The Golden Boulder, adjoining the Dromedary Humps, has a strike on what is supposed to be an extension of the Dromedary Humps vein, and lying close to the latter property. A new hoist has been ordered and preparations are being made for active development. The shaft at the present time is down over 50 ft., and the bottom is entirely in quartz and silicious ledge matter, which shows manganese and iron staining. Some silver sulphides occur, also horn silver. Considerable ore is sacked, ready for shipment. At the Dromedary Humps several new strikes have been made. Ore has been sacked, and a hoist will soon be installed.

Active development work is being done throughout the camp. At the Nevada Condors, which lies north of the Nevada Fairview, in the southern part of the district, a tunnel is being driven to cut the ledge, which is exposed on the surface. The Fairview Eagle and Eagles Nest Fairview have recently made some promising disclosures. Several new companies are starting work—the Nevada Hills Annex, Lena Fairview, Fairview Reliance, St. Paul, Cedars, and others.

The Nevada Hills is shipping steadily, and nearly every returning freighter brings ore to the railroad at Fallon. New developments have been encouraging and the company has already declared a second dividend. In No. 4 tunnel ore has been cut, which is said to sack without sorting.

New silver strikes are reported from Westgate, about 12 miles from Fairview. Water has been developed in the well below the town.

NYE COUNTY—TONOPAH

Ore Shipments—Shipments of ore over the Tonopah Railroad for the week ending April 20 were: Tonopah Company, 619 tons; Belmont, 488; Montana-Tonopah, 129; West End, 48; total, 1285 tons. There were 30 tons from Lone Mountain, making a total of 1315 tons. In addition the Tonopah Company sent 1850 tons to its mill.

Pennsylvania

ANTHRACITE COAL

Philadelphia & Reading — This company will build a mammoth breaker at Buckville, near Tamaqua, this summer. Plans have also been completed for a large breaker at Reevesdale, where a new shaft is being sunk.

BITUMINOUS COAL

Pittsburg Coal Company—This company has issued a statement for the quarter ended March 31, which gives the earnings as follows:

	1906.	1907.	Changes.
Earnings.....	$1,025,492	$1,025,430	D. $ 62
Charges.....	742,790	698,100	D. 44,690
Net balance....	$ 282,702	$ 327,330	I. $44,628

The charges in 1907 were made up as follows: Allowance for depreciation of coal lands, $159,899; depreciation of plant and equipment, $255,237; interest on first mortgage bonds, $282,964. The coal statement is as follows, in short tons:

	1906.	1907.	Changes.
Pittsburg Dis.....	4,142,227	3 637,163	D. 505,064
Hocking Dis.....	317,767	219,715	D. 98,052
Total coal.....	4,459,994	3,856,878	D. 603,116
Coke made	105 649	113,796	I. 8,147

The coke is all made in the Pittsburg district.

South Dakota

LAWRENCE COUNTY

Homestake—It has been found necessary to flood the Homestake mine to put out the fire which has burning for four weeks. Water has been turned in through two shafts and the open cut, and flumes are now being built, so that it may also be run in through the old Savage tunnel. All mills with the exception of the cyanide annexes, which have not made their clean-ups, are closed down for the first time in the history of the mine. There are in the workings 68,000,000 cu.ft., which it will be necessary to fill with water.

Texas

HOPKINS COUNTY

Lone Star Lignite Mining Company—This company has been organized at Dallas, Texas, with a capital stock of $200,000 for the purpose of mining lignite in Hopkins county. Officers of the company are: N. Watelsky, president; H. N. Watelsky, general manager; L. A. Allen, secretary-treasurer.

Utah

JUAB COUNTY

Tintic Ore Shipments—Shipments last week amounted to 136 carloads the contributing mines and respective amounts being: Ajax, 3; Beck Tunnel, 9; Black Jack, 1; Bullion Beck, 4; Carisa, 8; Centennial Eureka, 56; Colorado, 1; Eureka Hill, 3; Gemini, 6; Godiva, 2; Grand Central, 6; Laclede, 1; Lower Mammoth, 6; Mammoth, 10; Scranton, 8; Swansea, 2; Tintic Iron, 6; Uncle Sam, 2; Yankee Consolidated, 4 cars.

Shoebridge Bonanza—This property is to be operated again after a shut-down of several years.

Washington

OKANOGAN COUNTY

Molson Gold Mining Company—This company has placed a contract with the Merralls Machinery Company for machinery for the Poland China mine in Myers' Creek district, to cost, with the installation, about $18,000. It will include a 9x24-in. rock crusher, nine 1200-lb. rapid-crushing quadruple rapid-discharge stamp mills, with feeders; a No. 3 Merrall's improved roller mill, with large amalgamation plates; a 50-h.p. steam engine, boiler and accessories, and general equipment. The ore exposed in the mine averages about $20 per ton. The officers of the company are: D. W. Dart, president; Wm. H. Phillips, vice-president; Charles A. Haskett, secretary, and H. F. Beery, general manager, all of Dayton, Ohio. M. A. Smalley, of Chesaw, Wash., is treasurer.

West Virginia

MERCER COUNTY

Producers' Coal Company—At a recent meeting at Bluefield, E. L. Bailey was elected president of the company in place of A. I. Godfrey, and H. Archer Mitchell was elected general manager in place of S. S. Cofer. The company is one of the independent shipping companies in the field.

Canada

BRITISH COLUMBIA—BOUNDARY DISTRICT

Granby Consolidated—Hayden, Stone & Co. report that adverse weather conditions, together with a fuel shortage, proved a serious handicap to operations during the winter months, in consequence of which production suffered. Results for March, however, were probably the most satisfactory for those of any like period in the company's career. Net earnings were in excess of $225,000, while the cost of production was approximately 7.64c. per lb. copper. For the nine months ended March 31, the Granby has secured net earnings in excess of $1,600,000. Under normal working conditions it is capable of supplying 25,000,000 lb. of copper per annum, at a cost of 8c. per pound. The company has a well-filled treasury, an excellent management, an extraordinary ore supply, and one of the best smelting plants in the country.

ONTARIO—COBALT DISTRICT

Ore Shipments—Shipments of Cobalt ore over the Timiskaming & Northern Ontario Railway for the week ended April 20 were: Coniagas, 64,910 lb.; O'Brien, 128,290; Trethewey, 165,340; total, 358,540 pounds.

Buffalo—A rich silver vein has been struck about 20 feet north of the boundary between this property, in Cobalt and the Townsite. It was about 4 ft. below the surface and averages 2 in. in width.

Coniagas—Large additions to the plant and buildings at Cobalt are being made. There is now in place a Fairbanks-Morse friction hoist, a 100-h.p. boiler and a 12-drill duplex air compressor. Another 100-h.p. boiler is being installed. A concentrating plant will be in operation in a few weeks, which will be supplied with water by an electrically driven turbine pump to be installed at Sasiganaga lake. The concentrator will have a capacity of 100 tons of ore per day. Over 1400 ft. of drifting has been done at the 75-ft. level from the main shaft. The vein is narrow, but rich, and the wall rock in many places is shot with silver for 4 ft. on each side of the vein. A force of 96 men is at work in charge of Superintendent John Redington.

UNGAVA TERRITORY

A return presented to the Canadian Parliament regarding leases of mineral and coal lands and water powers in Ungava territory shows that the Dominion Development Company, of Philadelphia, is the only one which has not allowed its leases to lapse after application had been made and granted. The company has staked and now holds under patent 52 claims.

Mexico

GUADALAJARA

Rumor has it that the American Smelting & Refining Company, or the Guggenheim, interest, is contemplating the erection of a smelter or large reduction plant in the Guadalajara district, that engineers are in the field seeking the mines necessary as a basis for such a plant, and also that negotiations had been under way for the properties of Carlos Romero in Hostotipaquillo, as well as others in Jalisco, Colima, Tepic, and Sinaloa. Without doubt, however, this is mere rumor for a prominent official of the company has stated positively that there was nothing in it. It seems proper therefore to give this denial to the rumor so as to prevent in so far as it is possible an unnatural boom. The district is receiving much and natural attention and obtaining a healthy growth. The latest large deal in the district is that just consummated in Hostotipaquillo by the consolidation of the Cabrera, of Carlos Romero, and the America, of W. J. Payne, of Richmond, Va., into what will be known as the Virginia & Mexico Mining and Smelting Corporation, with a capital of $2,000,000 gold, and Jesse Scobey, of Denver, the promoter, as vice-president and general manager. The plans include the erection of a 150-ton stamp, concentration and cyanide mill. The ores are largely a silver sulphide.

Caridad y Anexas—This new company has acquired 180 pertinencias on the Panico ranch near Guachinango and about 60 kilometers west of Ameca. The company is capitalized at $200,000 Mexican, subscribed principally in Mexico City, Adolph Marx is president and Otto Vorrath manager. The ore runs high in copper, with good values in gold and silver, and the first shipments have already been made to the Aguascalientes smelter.

Africa

RHODESIA

Gold production reported in March was 46,887 oz. bullion. This makes a total for the three months ended March 31 of 125,561 oz. bullion in 1906, and 134,417 oz. in 1907; an increase of 8856 oz. The bullion reported this year was equal to 119,631 oz. fine gold, or $2,472,773. There were also 11,321 oz. silver reported.

Other production for the three months was 160 tons lead; 26 tons copper; 1 ton wolframite; 50 tons antimony ore; 3405 tons chrome ore; 27,815 tons coal.

Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

QUOTATIONS FROM IMPORTANT CENTERS

Coal Trade Review

New York, May 1—The coal trade in the West has received some support from the long continued cold weather, which has brought about a demand for domestic use which is quite unusual at this season. The call for steam coal is heavy, and the trade generally in good condition. Railroad service is better than it has been for a long time past.

In the East there is nothing new to report, the trade being quiet and steady, both in anthracite and bituminous coal.

COAL-TRAFFIC NOTES

Shipments of coal and coke originating on the Pennsylvania Railroad Company's lines east of Pittsburg for the year to April 20 were as follows, in short tons:

	1906.	1907.	Changes.
Anthracite	1,362,666	1,625,886	I. 263,220
Bituminous	10,413,594	11,212,907	I. 799,313
Coke	3,890,690	4,230,064	I. 339,374
Total	15,666,950	17,068,857	I. 1,401,907

The total increase this year was 8.9 per cent.

The Southwestern Interstate Coal Operators' Association gives out the following statement of coal production for the two months ended Feb. 28, in short tons:

	1906.	1907.	Changes.
Missouri	680,029	587,048	D. 92,981
Kansas	1,211,403	1,111,576	D. 99,827
Arkansas	394,128	406,369	I. 12,241
Indian Territory	627,415	488,680	D. 138,735
Total	2,912,975	2,593,673	D. 319,302

The total decrease this year was 11 per cent.

Shipments of Broad Top coal over the Huntingdon & Broad Top Railroad for the year to April 27 were 339,590 tons.

New York

ANTHRACITE

May 1—There was little or no change in the market during the past week. Demand is fair and shipments regular. Small steam sizes are extremely scarce and the demand is strong. Pea and buckwheat Nos. 1 and 2 are nearly out of the market and there seems to be no favorable outlook for increasing the supply in the near future. The new schedule takes effect today and prices are as follows: Broken, $4.35; egg, stove and chestnut, $4.60; pea, $3; buckwheat, $2.50; rice, $1.85; barley, $1.50. These prices for small coal are nominal and in many cases a premium is being received by the producer.

BITUMINOUS

The Atlantic seaboard soft-coal trade shows little change from last week, there being considerable unabsorbed coal at tidewater ports, but it is believed that these stocks are somewhat reduced from those of a week ago. Contract coal is moving forward fairly well and there seems to be a good supply of such orders in the hands of shippers. The vessel question is a prominent factor at the present time and rates are maintained. It is believed that with summer weather rates will decline 10@15c., which is the usual custom at this time.

Trade in the far East is fairly active on contract business, and there seems to be a slight shortage in stocks in this territory. Accumulations of anthracite at the discharging points are causing demurrage in numerous cases. Trade along the Sound is slow, some low-priced coal having been taken on, but the general trend is to give anthracite the preference. We hear of 20,000 tons at two points and 40,000 tons at another point on the Sound, the coal being of all kinds, awaiting unloading, and demurrage is general.

New York harbor trade is quiet and some stocks of coal are unsold at tide-water ports. This has produced a depressed feeling in the market and the lower grades have been offered as low as $2.35 @2.40 f.o.b. loading port. Good steam grades may be bought for $2.55@2.60. Trade is hampered by lack of barges. All-rail trade is slow, and there have been shipments on this class of business to relieve tidewater ports. Transportation from mine to tide is a little irregular, although fairly up the schedule; car supply is up to all demands.

Vessels in the coastwise trade are in small supply and charters are made "to arrive." When vessels are discharged in the East the scarcity in this district will be relieved. We quote current rates from Philadelphia, Boston, Salem and Portland $1.25 and discharge; to Lynn, Newburyport, Portsmouth, Saco and Gardiner, $1.25; to Bath, $1.15; to Bangor, $1.30; to the Sound, $1; loading and discharging clause included where usual.

Birmingham

April 29—Continued activity is noted in the coal districts of Alabama. The production is greater than it has been in many months. No change is noted in prices for coal or coke. Present conditions as well as the future prospects in Alabama are all that could be desired.

Chicago

April 29—Strength continues to characterize the local coal market. In part this is due to the cool weather of the month just closing; in part also to the resolution of operators to close out the surplus of coal on track in this city. Anthracite sold heavily in the last week.

Production at the Western mines has been reduced, to reduce demurrage troubles. Eastern coals have been quiet but firm, with no disposition on the part of either sellers or buyers to force the market.

Coal from the mines of Illinois and Indiana brings $2@2.75 for lump and egg; $1.75@2.50 for run-of-mine, and $1.40@1.60 for screenings. The tendency is toward increase of demand for fine coals.

Eastern coals are quiet and firm. Hocking brings $3.15 for 1¼-in.; smokeless, $3.35 for run-of-mine. Youghiogheny is quiet at $3.15 for ¾-in. gas and Pittsburg is firm at $3.15 for 1¼-in. No. 8.

Cleveland

April 30—The tardiness of the lake navigation season this year is occasioning some inconvenience in local coal movements. The anthracite business continues steady with good absorption of coal receipts. Bituminous dealers state that considerable coal is coming into the city, and as consumers are more than stocked up, prices are low. Pittsburg No. 8 slack is quoted at $1.70@1.75 and straight No. 8 at $1.80. Pittsburg run-of-mine $2.15 and ¾-in. $2.25 on track Cleveland. The season will open the latter part of this week on the lakes, which is expected to restore the market to its normal condition.

Indianapolis

April 27—The continued low temperature has kept the consumption of coal up to an average almost equal to the winter months. The dealers have been kept so busy delivering that they have made no attempt as yet to solicit summer business. During May, however, local dealers will make their usual contracts with customers for anthracite coal.

The demand for Indiana coal is a shade better than usual—especially is this true of steam coal. The 16,000 Indiana miners all have work now from three to five days each week. The railroads are moving the coal satisfactorily in the coal business.

The Indiana mine operators have appealed to consumers of coal, and especially the public institutions, for a more

generous use of Indiana coal, protesting against the discrimination in favor of Ohio and West Virginia coal. In many instances they have induced institutions to give Indiana coal a thorough test.

Pittsburg

April 30—The week opened with all the mines in the district in full operation, but today there was a scarcity of cars. Operators fear that this is the beginning of a shortage and do not expect to run the mines as fully as they have during the past two months. Some large shipments have been made to lake ports for the northwestern markets and the contracts taken for this trade greatly exceed former years. Some doubt is expressed as to filling all of these contracts, due to the inability of the railroads to handle the tonnage. Prices are firm on the basis of $1.20@1.25 for mine-run coal at mine, and an advance likely will be made if the car shortage becomes more serious. Some large shipments of coal to Southern ports were made by the Monongahela River Consolidated Coal and Coke Company, the rivers being navigable all week.

Connellsville Coke—Another decline in coke prices for prompt shipment is noted this week, furnace coke being quoted at $2.50@2.60 and foundry at $3.25@3.40. For second-half delivery prices are from 15 to 25c. higher. The *Courier* in its summary for the week gives the production in both regions at 416,583 tons. The shipments aggregated 14,503 cars, distributed as follows: To Pittsburg, 4726 cars; to points west of Connellsville, 8854 cars; to points east of Connellsville, 923 cars.

Foreign Coal Trade

May 1—The coal production of the colony of Natal, South Africa, for the year is reported as follows:

	1906.	1907.	Changes.
Exported by rail	172,827	166,460	D. 6,367
Exported by sea	42,618	215,977	I. 173,359
Sold to steamships..	561,250	487,892	D. 73,358
Natal railways	208,223	221,444	I. 13,221
Sold in colony.....	144,489	146,940	I. 2,451
Total	1,129,407	1,238,713	I. 109,306

The coal exported by rail goes to the Kimberly diamond district chiefly.

Exports of coal and coke from the United States for the three months ended March 28 are reported by the Bureau of Statistics as follows:

	1906.	1907.	Changes.
Anthracite	376,013	469,463	I. 93,450
Bituminous.....	1,681,414	1,784,653	I. 103,239
Total coal.....	2,057,427	2,254,116	I. 196,689
Coke.....	186,201	205,907	I. 19,706
Total.....	2,243,628	2,460,023	I. 216,395

These figures do not include coal bunkered, or sold to steamships engaged in foreign trade. The coke exported went chiefly to Mexico and eastern Canada; the distribution of the coal was as follows:

	1906.	1907.	Changes.
Canada.....	1,388,586	1,485,488	I. 97,302
Mexico.....	281,052	293,577	I. 12,525
Cuba.....	216,950	199,826	D. 17,124
Other W. Indies.....	105,714	136,321	I. 30,607
Europe.....	10,925	18,532	I. 7,607
Other countries.....	54,200	120,372	I. 66,172
Total.....	2,057,427	2,254,116	I. 196,689

The exports to Europe were chiefly to Italy; those to other countries, to South America. The exports to Canada—65.9 per cent. of the total in 1907—were, in detail, as follows:

	1906.	1907.	Changes.
Anthracite.....	363,499	458,334	I. 94,835
Bituminous.....	1,025,087	1,027,554	I. 2,467
Total.....	1,388,586	1,485,888	I. 97,302

There was a considerable increase in anthracite, but only a small one in bituminous coal.

Imports of coal and coke into the United States for the three months ended March 31 are reported as follows, in tons:

	1906.	1907.	Changes.
Great Britain.....	58,006	9,551	D. 48,455
Canada.....	450,663	347,223	D. 103,440
Japan.....	4,962	47,900	I. 42,938
Australia.....	53,399	86,163	I. 32,764
Other countries.....	4,060	483	D. 3,577
Total coal.....	571,090	491,320	D. 79,770
Coke.....	41,174	44,777	I. 3,603
Total	612,264	536,097	D. 76,167

Some Nova Scotia coal comes to New England ports, but the bulk of the imports of coal is on the Pacific coast. The coke is chiefly from British Columbia, though a little comes from Germany.

Iron Trade Review

New York, May 1—There are signs of an increased buying movement apparent, and the demand for fourth-quarter pig iron is more pronounced than it has been for some weeks. Buyers seem to be making up their minds that it is of little use waiting, or else they want to protect themselves by contract in good season. In finished material also there are signs of renewed buying and inquiries are more frequent. This is especially the case with structural steel, while bars are also in strong demand. In other lines a good business seems to be assured.

United States Steel Corporation—The preliminary statement for the quarter ended March 31, shows net earnings of $39,122,492; which compares with $36,634,190 for the March quarter of 1906, and $41,744,964 for the December quarter. The income statement for the quarter is as follows:

Net earnings.....	$39,122,492
Sinking funds, depreciation, etc.	$5,154,521
Interest on bonds, etc.....	6,936,963
Fund for new additions, etc....	14,500,000
Total charges.....	$26,591,484
Dividends	8,846,432
Balance	$12,561,008
Net surplus for quarter	$3,684,576

Dividends declared for the quarter were 1¾ on preferred, and 0½ per cent. on common stock. The unfilled orders on the books March 31, amounted to a total of 8,043,858 tons, which compares with 8,489,718 tons on Dec. 31, and 7,018,712 tons on March 31, 1906. The losses by the floods in Pittsburg and the Ohio valley are estimated at about $1,500,000, but this is not officially stated.

Iron and Steel Exports — Exports of iron and steel, including machinery, from the United States for March, and the three months ended March 31, are valued as below by the Bureau of Statistics of the Department of Commerce and Labor:

	1906.	1907.	Changes
March.....	$14,290,183	$16,412,616	I. $2,122,433
Three months.	40,019,546	44,686,594	I. 4,667,048

The total increase for the two months was 9.9 per cent. The leading items of export for the three months were, in long tons:

	1906.	1907.	Changes.
Pig iron.....	20,367	20,135	D. 232
Billets, ingots & blooms	69,147	30,861	D. 38,286
Bars.....	19,877	20,540	I. 663
Rails.....	91,079	72,712	D. 18,367
Sheets and plates.	20,219	31,220	I. 11,001
Structural steel.....	22,189	30,266	I. 8,077
Wire	38,683	38,035	D. 548
Nails and spikes.....	17,704	13,697	D. 4,007

The main increases were in structural steel and wire. There was a considerable decrease in rails.

Iron and Steel Imports — Imports of iron and steel, including machinery, from the United States for March and the three months ending March 31 are valued by the Bureau of Statistics as follows:

	1906.	1907.	Changes.
March.....	$3,028,592	$3,702,060	I. $ 673,468
Three months...	7,328,782	10,019,108	I. 2,690,326

The increase for the three months was 36.7 per cent. The chief items of the iron and steel imports for the three months were, in long tons:

	1906.	1907.	Changes.
Pig iron.....	72,344	154,679	I. 82,335
Scrap.....	6,759	4,053	D. 2,706
Ingots, blooms, etc.....	5,431	4,501	D. 930
Bars.....	9,536	8,412	D. 1,124
Wire-rods	4,255	4,271	I. 16
Tin-plates.....	11,242	12,649	I. 1,407

There was a large proportional increase in pig iron, chiefly from Great Britain.

Iron Ore Movement—Exports and imports of iron ore in the United States for the three months ended March 31 are reported as follows, in long tons:

	1906.	1907.	Changes.
Exports.....	10,662	1,692	D. 8,970
Imports..... ...	276,781	264,896	D. 11,885

Most of the exports were to Canada. Imports were from Cuba, Spain and Algeria.

Imports of manganese ore for the three months were 50,899 tons in 1906, and 50,069 tons in 1907; a decrease of 830 tons.

Baltimore

April 30—Imports for the week included 889 tons spiegeleisen, 779 tons ferromanganese and 215 casks of ferrosilicon. There was also received 420 tons manganese ore. Receipts of iron ore were

4200 tons from Cuba, and 6630 tons from Beni-seif; 10,830 tons in all.

Exports included 2948 tons steel rails and 153 tons splice-bars to Buenos Aires.

Birmingham

April 29—Demand for Southern pig iron is strong and during the past 10 days some good orders have been booked for future deliveries. What little iron can be obtained for delivery during the third quarter of the year is quoted at over $19 per ton, No. 2 foundry. Fourth-quarter iron is being held strongly at $19. The production shows a little improvement. The Woodward Iron Company now has two furnaces in operation. The Shelby Iron Company is doing well with its two furnaces in blast, one on charcoal and the other on coke iron. The furnace at Anniston will be ready for the torch in a few weeks. The little Quinn charcoal furnace at Gadsden has changed hands and will be started up in a few weeks. The iron to be manufactured here will be used entirely by the car-wheel works.

Small lots of spot iron are being dealt in again in this section, $23.50 per ton, No. 2 foundry, being the quotation mentioned.

Chicago

April 29—To all appearance the iron market is slowly but surely strengthening. Contracts for second-half deliveries are increasing and the amount of quick-delivery orders has not abated.

Southern holds firmly to $18.50@19 Birmingham, for second-half delivery, and $27@27.50 Chicago for quick deliveries. Northern is held at $27@28 for speedy delivery and about $24.50 for second-half delivery on contracts. Northern iron is scarce for immediate deliveries and Southern agents profess to be independent concerning the same kind of business. There is every evidence of advance to greater firmness. The local market continues extraordinarily strong for finished materials.

Coke is still easy, the supply being plentiful and the demand not yet great. Connellsville 72-hour sells for $6.15, Chicago.

Cleveland

April 30—Since no iron ore has been received at Cleveland as yet, supplies on docks are diminishing rapidly. Valley furnaces are taking up considerable ore, and it is expected that when navigation opens there will be a very light supply on hand. No trouble is expected with lake hands this season. The wages of mates have been raised voluntarily by the Lake Carriers' Association.

Pig iron is quiet. Bessemer is quoted $21.90; No. 2 foundry, $23; No. 2 Southern, $22.85. The Youngstown Sheet and Tube Company has advanced the price of merchant pipe one point in the base throughout.

Coke is weak. Future-delivery furnace is $2.65; foundry, $3.35, at ovens.

Philadelphia

May 1—Very little change has taken place in the pig-iron market, and the sentiment among the trade is that there is very little probability of any material changes. There is some talk of increasing importations, and the surface facts of the situation make this seem probable, but nothing definite has transpired upon which to base predictions. Basic iron is developing strength under urgent inquiry; malleable is strong under fair sales; forge is holding its own without any difficulty. A few inquiries are being made with reference to late deliveries, but the parties interested on the selling side manifest indifference. Foundry irons are selling in a moderate way, and there is but little inquiry this week for future deliveries. Gray forge is quoted today at $22.75; basic, $24; No. 2 X, $26@26.50. Scotch iron is nominal at $23.50, and English iron at $21.25.

Steel Billets—For the time being very little is transpiring in the billet market, and quotations are given at $32.

Bars—The bar-iron demand is stronger from store, but our mill people are not able to report the placing of large orders. The car builders might be able to obtain slight concessions were they to place some of the orders which have been talked about. Steel bars are scarce and strong.

Sheets—The mills are shipping out a great deal of sheet, and are keeping their engagements promptly, which is a matter of satisfaction to customers. The retail distribution is increasing a little.

Pipes and Tubes—The market is strong, the mills are badly oversold and buyers are showing an anxiety to make arrangements for the delivery of material during the third quarter of the year. Discounts remain unchanged.

Plates—There is a growing demand for iron and steel plate during the second quarter, but only a small amount of business actually placed.

Structural Material—There is more activity on the part of the smaller buyers, who need a few hundred tons promptly. Most of the business is of this sort.

Old Material—The scrap market is quiet and scrap dealers are busily endeavoring to increase their supply, as they are confident of a heavy summer demand.

Pittsburg

April 30—There was no material change in the iron and steel markets during the week, demand for all lines of finished products continuing heavy and mills unable to catch up on deliveries. One of the events of the week was the opening of the cotton tie market, a month earlier than usual, and fixing the price for the season at 95c. a bundle, an advance of 10c. The Carnegie Steel Company is the principal producer of cotton ties in this district. It is expected that the total business will amount to fully 50,000 tons, which is greatly in excess of previous years. The opening of the order books for steel rails for 1908 has not brought out any large contracts.

Specifications for structural material are larger and promises for delivery range from two to three months. The large plate mills are filled with business for the rest of the year. For prompt shipment premiums are freely paid. Eastern mills are still able to supply plates for early delivery, but are not receiving 2c., or $6 premium, as they were a couple of months ago.

The merchant pipe trade is the most congested of all finished lines. The National Tube Company is not prepared to name prices, as it cannot promise delivery before Oct. 1 and the Youngstown Sheet and Tube Company has announced an advance of one point, or $2 a ton, on steel pipe. Its extreme discount in large lots is now 73 and 5 per cent. or $6 a ton above the quotations withdrawn by the leading interest early last month. The principal wrought-iron pipe producer this week revised its quotations and advanced the price of 7- and 8-in. pipe $4 a ton. The American Sheet and Tin Plate Company is not booking orders for tin-plate beyond Oct. 1, but the independents are accepting business for the fourth quarter at $4 a box, an advance of 10c. a box over the ruling price.

Pig Iron—Bessemer pig iron is practically sold up for the rest of the year and this indicates that large steel interests have bought and the sales have not been made public. There are rumors that the Steel Corporation, the Jones & Laughlin and the Lackawanna Steel companies entered the market for second-half early and the heavy buying is responsible for the sharp advance in prices noted last week. The only sale recorded this week was 1200 tons of bessemer iron for May and June delivery at $23, Valley furnaces, but this was merely an accommodation to an old customer and does not represent the price for second quarter. Bessemer for second quarter is nominally $24, No. 2 foundry, $25 and gray forge, $21.50, all f.o.b. Valley furnaces. For second-half delivery $22 is the minimum price for bessemer and basic.

Steel—Early deliveries of bessemer and open-hearth steel billets are hard to obtain at any price. A small lot of bessemer billets is reported to have been sold this week at $29, Youngstown, equal to $29.95, Pittsburg. Steel bars are strong at 1.60c. and a few sales are said to have been made for prompt delivery at $1 premium. Plates remain firm at 1.70c.

Sheets—There is no change in the sheet

market. Mills are not catching up on deliveries and new business is still being booked. Black sheets are strong at 2.60c. and galvanized at 3.75c. for No. 28 gage.

Ferro-Manganese—Prices are lower, quotations for prompt shipment being $70 @71 per ton.

Cartagena, Spain

April 13—Messrs. Barrington & Holt report shipments of iron ore for the week: Great Britain, 13,400 tons; Rotterdam 16,400; Baltimore, 2950; total, 32,750 tons. Shipments are active, chiefly on contracts, little new business being reported. Freight rates are easier.

Quotations for iron ores are: Ordinary 50 per cent. ore, 9s. 9d.@10s. 3d.; low phosphorus, 10s. 9d.; specular ore, 55 per cent., 12s. 6d., all f.o.b. shipping port. For manganiferous ore, same terms, quotations for No. 3—12 per cent. manganese, and 35 iron—are 14s. 6d. No higher grades on the market.

Pyrites—The quotation for iron pyrites, 40 per cent. iron and 43 sulphur, is 11s. 9d. per ton, f.o.b. shipping port.

Chemicals

New York, May 1—The market is active, with good demand for all kinds of heavy chemicals.

Copper Sulphate — Demand remains steady, with no surplus of supplies. Prices remain unchanged, and we quote $7.50 per 100 lb. for carload and larger lots; $7.75 per 100 lb. for smaller parcels.

Exports of copper sulphate from the United States for the three months ending March 31 were 6,763,582 lb. in 1906, and 3,877,832 lb. in 1907; a decrease of 2,885,750 lb. The exports this year contained the equivalent of about 433 tons of fine copper.

Phosphates—Exports of phosphates from the United States for the three months ending March 31 were, in long tons:

	1906.	1907.	Changes.
Crude	252,432	207,572	D. 44,860
All other	5,836	7,077	I. 1,241
Total	258,268	214,649	D. 43,619

The chief exports this year were 68,456 tons to Germany; 43,270 to Great Britain; 32,874 to France; 15,826 to Italy.

Metal Market

NEW YORK, May 1

Gold and Silver Exports and Imports
At all United States Ports in March and year

Metal.	Exports.	Imports.	Excess.
Gold:			
Mar. 1907..	$2,126,173	$ 5,007,319	Imp. $2,881,146
" 1906 .	5,918,627	5,630,695	Exp. 287,932
Year 1907..	5,703,304	11,607,691	Imp. 5,904,387
" 1906..	20,146,622	10,316,087	Exp. 9,830,535
Silver:			
Mar. 1907..	5,058,461	3,936,139	Exp. 1,122,322
" 1906..	5,213,811	3,509,838	" 1,703,973
Year 1907..	14,669,396	11,315,168	" 3,354,228
" 1906..	19,165,608	12,676,998	" 6,488,610

These statements cover the total movement of gold and silver to and from the United States. These figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Movement, New York

For week ending Apr. 27 and years from Jan. 1

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week.....	$31,200	$ 92,530	$ 910,407	$ 15,404
1907.....	1,791,536	5,278,377	12,449,486	658,393
1906	1,080,036	13,760,410	22,332,033	655,680
1905.....	32,874,807	4,932,123	10,806,354	1,175,875

Exports of gold for the week were to South America; of silver to London. Imports for the week, both gold and silver, were from the West Indies and Panama.

The joint statement of all the banks in the New York Clearing House for the week ending April 27 shows loans $1,123,417,600, a decrease of $1,587,300; deposits, $1,106,083,300, a decrease of $1,980,200, as compared with the previous week. Reserve accounts show:

	1906.	1907.
Specie	$186,734,300	$213,126,300
Legal tenders	80,803,900	75,766,300
Total cash	$267,538,200	$288,892,600
Surplus	$10,367,400	$ 12,346,775

The surplus over legal requirements shows an increase of $641,750, as compared with the previous week this year.

Specie holdings of the leading banks of the world, April 27, are reported as below, in dollars:

	Gold.	Silver.	Total.
Ass'd New York	.....	.....	$213,126,300
England	$180,956,520	.....	180,956,520
France	517,837,880	$196,115,420	713,953,300
Germany	176,135,000	58,875,000	235,010,000
Spain	77,250,000	126,350,000	203,600,000
Netherlands	25,776,000	28,775,000	54,551,000
Belgium	16,486,665	8,218,335	24,705,000
Italy	162,110,000	25,095,000	187,205,000
Russia	597,635,000	29,440,000	627,075,000
Aust.-Hungary	227,300,000	62,290,000	289,590,000
Sweden	20,760,000	.....	20,760,000

The banks of England and Sweden report gold only. The New York banks do not separate gold and silver in their reports.

Imports of gold and silver at the port of San Francisco for the three months ending March 31 were as follows:

	Gold.	Silver.
Coin	$ 733,821	$ 88,431
Bullion	544,142	740,855
Total	$1,277,963	$ 829,286

Exports for the three months are reported as follows:

	Gold.	Silver.
Coin	$ 2,000	$ 530,240
Bullion	.....	27,476
Total	$ 2,000	$ 557,716

Exports this year have been light. The silver was chiefly in Mexican dollars.

The United States Treasury Department on April 29 bought 100,000 oz. fine silver at 66.355c. per oz., delivered at the Philadelphia mint.

Shipments of silver from London to the East are reported by Messrs. Pixley & Abell as follows, for the year to April 18:

	1906.	1907.	Changes.
India	£ 5,751,978	£4,376,908	D. £ 1,375,070
China	.....	.....	.....
Straits	.....	204,050	I. 204,050
Total	£ 5,751,978	£4,580,958	D. £ 1,171,020

Receipts for the week were £102,000 from New York, £352,000 from the Straits and £47,000 from China; a total of £501,000. Exports were £227,500, all to India. The receipts from the East indicate an unusual movement.

Indian exchange has shown a weaker tendency, but the Council bills offered in London were all taken at an average of 16.09d. per rupee. The demand for silver for India has been moderate.

Prices of Foreign Coins

	Bid.	Asked.
Mexican dollars	$0.50¾	$0.52¾
Peruvian soles and Chilean	0.46	0.49
Victoria sovereigns	4.85	4.87
Twenty francs	3.85	3.89
Spanish 25 pesetas	4.78½	4.80

SILVER AND STERLING EXCHANGE.

April.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	April-May	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
25	4.86	65¾	30 5/16	29	4.86¼	66⅛	30⅛
26	4.86	65¾	30 5/16	30	4.86¼	66	30 7/16
27	4.86	65⅞	30⅜	1	4.86¼	65⅞	30⅜

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver, 0.925 fine.

Other Metals

Daily Prices of Metals in New York.

April-May.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
25	25 @25⅛	24⅛ @24⅜	101⅛	42¼	6.00	6.60	6.45
26	25 @25⅛	24⅛ @24⅜	103¼	42⅛	6.00	6.60	6.45
27	25 @25⅛	24⅛ @24⅜	.....	42⅛	6.00	6.55 @6.60	6.40 @6.45
29	25 @25⅛	24⅛ @24⅜	103⅛	42⅝	6.00	6.55 @6.60	6.40 @6.45
30	25 @25⅛	24⅛ @24⅛	104⅛	42¾	6.00	6.55 @6.60	6.40 @6.45
1	25 @25⅛	24⅛ @24½	106¾	42¾	6.00	6.55 @6.60	6.40 @6.45

London quotations are per long ton (2240 lb.) standard copper, which is now the equivalent of the former g.m.b's. The New York quotations for electroytic copper are for cakes, ingots or wirebars, and represent the bulk of the transactions as made with consumers, basis, New York, cash. The price of cathodes is 0.125c. below that of electrolytic. The lead prices are those quoted by the American Smelting and Refining Company for near-by shipments of desilverized lead in 50-ton lots, or larger. The quotations on spelter are for ordinary western brands; special brands command a premium.

Copper — Further progress has been made during the past week toward the re-establishment of a more proportionate parity between the European and domestic markets.. While consumers in this country are still holding aloof, buyers abroad took hold quite vigorously and rather large transactions in electrolytic are reported for export, which did not fail to have a stimulating influence. The market for Lake copper, however, continues quiet and unchanged, while business in casting

lags and that grade continues to sell at an unusually large discount. As the result of the improving demand the market closes firmer at 25@25½ for Lake copper; 24¼@24½ for electrolytic in ingots, cakes and wirebars; 22¾@23¼ for casting copper.

There has been quite an upset of the bear element in the London standard market, which, upon being forced to cover, found that the supplies had been withdrawn either for export to America or for European consumption. As a result, quite a sharp upward movement ensued, and the market closes considerably higher, the last quotations being £106 15s. for spot, £104 15s. for three months'.

Statistics for the second half of April show a decrease in the visible supplies of 800 tons.

Refined and manufactured sorts we quote: English tough, £113@114; best selected, £114@115; strong sheets, £123.

Exports of copper from New York for the week were 1138 tons. Our special correspondent gives the exports from Baltimore for the week at 755 long tons of copper.

The first shipments of Lake copper by water, for the season, were made this week.

The offices of L. Vogelstein & Co. have been removed to the American Security building, No. 100 Broadway, New York.

Copper Sheets—The base price of copper sheets is 32c. per pound.

Copper Wire—The base price of copper wire, No. 0000 to No. 8, is 27¼@27½c. per pound.

Tin—Notwithstanding the continued improvement in prices abroad, where quite an active business is taking place from day to day, consumers in this country have not changed their attitude and persist in their policy of covering only their immediate requirements. The closing is cabled from London as £195 10s. for spot, £193 10s. for three months. Business here has been done at 42¾c.

Statistics for the month of April show a decrease in the visible supplies of 1200 tons.

Lead—The market is unchanged at 6c. New York.

There has been quite a heavy demand for lead abroad, particularly for near-by shipment, supplies for which are scarce. The close is higher at £20 5s. for Spanish lead, £20 7s. 6d. for English lead.

St. Louis Lead Market—The John Wahl Commission Company reports as follows: Lead presents no novelty; it is quiet, with sales at 5.92½c. for all the various brands.

Spanish Lead Market—Messrs. Barrington & Holt report from Cartagena, Spain, under date of April 13, that the price of lead has been 90.50 reales per quintal, silver being 13.25 reales per ounce; exchange, 27.95 pesetas to £1. The lead price is equivalent, on current exchange, to £18 3s. 3d. per long ton, f.o.b. Cartagena. Exports for the week were 600 tons desilverized and 490 tons argentiferous to Great Britain; 66 tons desilverized, and 227 tons argentiferous to Marseilles; 300 tons desilverized to Amsterdam; 50 tons antimonial lead to Hamburg; 1733 tons in all.

Spelter—The market is rather dull. Offerings are not very heavy, but the demand is of such insignificant proportions that the small quantities which come on the market have an undue influence, so that prices close somewhat lower at 6.55 @6.60 New York, 6.40@6.45 St. Louis.

The London market is slightly better and closes at £26 for good ordinaries, £26 5s. for specials.

Zinc Sheets—The base price is now $8.60 per 100 lb. (less discount of 8 per cent.) f.o.b. cars at Lasalle and Peru, in 600-lb. case for gages No. 9 to 22, both inclusive; widths from 32 to 60 in., both inclusive; the lengths from 84 to 96 in., both inclusive. The freight rate to New York is 27.5c. per 100 pounds.

Spanish Zinc Ore Market—Messrs. Barrington & Holt report from Cartagena, Spain, under date of April 13, that the market remains quiet. Shipments for the week were 90 tons calamine to Liverpool and 1900 tons blende to Antwerp.

Antimony—The market is lower, with Cookson's at 23½c., Hallett's at 20½@21c., and ordinary brands at 20c.

Nickel—For large lots, New York or other parallel delivery, the chief producer quotes 45@50c. per lb., according to size and terms of order. For small quantities prices are 50@65c., same delivery.

Platinum—The market has fluctuated rather sharply and prices are a little uncertain. The latest quotation is $32 per ounce for ordinary metal and $35 for hard. Scrap is quoted at $24 per ounce.

Minor Metals—For minor metals and their alloys, wholesale prices are, f.o.b. works:

	Per Lb.
Cadmium, 99.5% f. o. b. Hamburg	1.40@1.46
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Chrome (70)	11½c.
Ferro-Chrome (7-9% carbon, per lb. Cr.)	10½c.
Ferro-Chrome (1% C. for each 10% Cr.)	11@11½c.
Ferro-Chrome (60-64% Cr., 3-4% C.)	12@12½c.
Ferro-Chrome (60-70% Cr., 1% C. or less)	38c.
Ferro-Molybdenum (50%)	90c.
Ferro-Titanium (20%)	80c.
Ferro-Tungsten (37%)	50c.
Ferro-Vanadium (25-50%, per lb. vanadium contents)	$5@10.
Magnesium, pure (N. Y.)	1.50
Manganese, pure 98@99% N. Y.	75c.
Manganese—Copper (80@70%) N. Y.	45c.
Molybdenum (98@99%, N. Y.)	$1.70
Phosphorus, foreign red (f. o. b. N. Y.)	90c.
Phosphorus, American yellow (f. o. b. Niagara Falls)	42c.
Tungsten (best) per und lots	1.35
Ferro-Silicon (50%) spot. Ex. ship Atlantic ports	$110 ton.

Variations in price depend chiefly on size and conditions of orders:

Quicksilver—Current prices in New York are $41 per flask of 75 lb. for large quantities and $42 for smaller orders. San Francisco orders are $38@39 per flask, according to quantities, for domestic orders, and $37@37.50 for export. The London price is £7 per flask, but £6 16s. 3d. is quoted by jobbers.

Imports and Exports of Metals

Copper — Exports of copper from the United States for the three months ended March 31 are reported as below by the Bureau of Statistics of the Department of Commerce and Labor, in long tons, of 2240 lb. each:

	1906.	1907.	Changes.
Great Britain	4,775	5,281	I. 506
Belgium	637	379	D. 58
France	9,525	7,781	D. 1,744
Italy	1,758	2,163	I. 405
Germany and Holland	25,974	20,772	D. 5,202
Russia	682	888	I. 206
Other Europe	3,045	1,798	D. 1,247
Canada	330	386	I. 56
China	800	...	D. 600
Other countries	37	21	D. 16
Total metal	47,563	39,469	D. 8,094
In ores and matte	1,937	1,011	D. 926
Total	49,500	40,480	D. 9,020

The total decrease was 18.2 per cent. The actual quantity of ore and matte exported this year was 19,298 tons, of which 16,835 tons went to Canada, 2320 tons to Mexico and 123 tons to Germany.

Imports into the United States of copper and copper material for the three months ended March 31, with re-exports of foreign metal, are reported as follows; the figures give the contents of all material in long tons of fine copper:

	Metal.	In ore, etc.	Total.
Mexico	9,776	4,280	14,056
Canada	2,546	1,482	4,028
Great Britain	6,165	.....	6,165
Japan	710	.....	710
South America	.....	1,296	1,296
Other countries	4,769	315	5,084
Total imports	23,966	7,373	31,339
Re-exports	178	....	178
Net imports	23,788	7,373	31,161
Net imports, 1906	19,106	6,095	25,201

The total increase in the net imports was 5960 tons, or 23.7 per cent. The actual tonnage of ores and matte imported from Mexico this year was 23,827 tons; from Canada and Newfoundland, 34,496; from South America, 10,955 tons.

The exports and net imports compare as follows:

	1906.	1907.	Changes.
Exports	49,500	40,480	D. 9,020
Net imports	25,201	31,161	I. 5,960
Excess, exports	24,299	9,319	D. 14,980

This shows a decrease of 61.6 per cent. in the excess of exports this year.

Tin—Imports of tin into the United States for the three months ending March 31 were as follows, in long tons:

	1906.	1907.	Changes.
Straits	3,904	4,339	I. 435
Australia	159	159	.....
Great Britain	6,493	6,029	D. 464
Holland	116	502	I. 386
Other Europe	437	356	D. 81
Other countries	6	1	D. 5
Total	11,115	11,386	I. 271

There was a small gain this year—2.4 per cent. only.

Lead—Imports of lead into the United States in all forms, with re-exports of imported metal, are reported as below for the three months ended March 31, in short tons, of 2000 lb. each:

	1906.	1907.	Changes.
Lead, metallic	2,376	5,506	I. 3,130
Lead in ores and base bullion	20,927	13,984	D. 6,943
Total imports	23,303	19,490	D. 3,813
Re-exports	10,955	5,299	D. 5,656
Net imports	12,348	14,191	I. 1,843

Of the imports this year 12,395 tons were from Mexico, and 1492 tons from Canada. Exports of domestic lead were 64 tons in 1906, and 104 tons in 1907; an increase of 40 tons.

Spelter—Exports of spelter from the United States for the three months ended March 31 were 1664 short tons in 1906, and 218 tons in 1907; a decrease of 1446 tons. Exports of zinc dross were 3419 short tons in 1906, and 3259 tons in 1907; a decrease of 160 tons. Exports of zinc ore were 8002 tons in 1906, and 6071 tons in 1907; a decrease of 1931 tons.

Imports of spelter for the three months were 264 short tons in 1906, and 216 tons in 1907; a decrease of 48 tons.

Antimony—Imports of antimony into the United States for the three months ended March 31 were as follows, in pounds:

	1906.	1907.	Changes.
Metal and regulus	2,089,521	2,924,058	I. 834,53
Antimony ore	487,641	757,597	I. 269,95

There was a large increase this year, both in metal and in ore.

Nickel—Imports of nickel ore and matte into the United States for the three months ended March 31 were 2977 tons in 1906, and 3555 tons, containing 4,487,585 lb. metal, in 1905. The metal contents were not reported last year.

Exports of nickel, nickel oxide and nickel matte for the three months were 3,234,180 lb. in 1906, and 2,872,832 lb. in 1907; a decrease of 361,348 lb. this year.

Platinum—Imports of platinum into the United States for the three months ended March 31 were 3042 lb. in 1907, and 2536 lb. in 1906; a decrease of 506 lb. this year.

Quicksilver—Exports of quicksilver from the United States for the three months ended March 31 were 205,834 lb. in 1906, and 159,536 lb. in 1907; a decrease of 46,298 lb. this year.

Aluminum—Exports of aluminum from the United States for the three months ended March 31 were valued at $29,503 in 1906, and $84,283 in 1907; an increase of $54,780 this year.

Missouri Ore Market

Jopin, Mo., April 27—The highest price paid for zinc was $52 per ton, on an assay base of $49, ranging down to $47 per ton of 60 per cent. zinc. The average price was $47.28. The highest price paid for lead was $82, and the average price $79.74.

The shipments of four months this year exceed the corresponding period of last year by 23,152,060 lb. zinc ore, 7,995,480 lb. lead ore, and in value, $562,395.

A strike in the mines of the American Zinc, Lead and Smelting Company has thrown 300 men out of employment and shut down all five of this company's mines and mills, the most extensive in the district. The machine-drill men, their helpers and the tub-hookers struck for an advance of 25c. each per day, which would make their wages $3, $2.75 and $2.25. The cause of the strike is dissatisfaction because of the high prices paid shovelers, who, working by the piece, earn as high as $1 per hour.

Following are the shipments of zinc and lead from the various camps of the district for the week ending April 27:

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	3,079,000	922,780	$112,346
Joplin	2,654,830	382,500	81,014
Galena-Empire	1,214,980	190,440	36,587
Alba-Neck City	1,093,780	1,450	27,402
Badger	675,290	.....	17,219
Duenweg	391,220	149,370	15,558
Oronogo	520,200	32,580	13,465
Granby	555,000	60,000	12,500
Prosperity	354,340	68,680	11,428
Spurgeon	398,240	79,890	11,186
Aurora	541,510	31,030	9,737
Carthage	160,120	.....	4,000
Zincite	153,130	1,460	3,733
Sherwood	127,210	2.940	3,170
Carl Junction	109,910	7,880	2,952
Baxter Springs	107,190	.....	1,518
Sarcoxie	56,710	.....	1,361
Ash Grove	.....	32,460	1,265
Totals	12,187,660	1,963,460	$366,441
Four months	204,943,780	31,845,280	$6,176,348
Zinc value, the week, $288,146; 4 mos.,			$4,853,044
Lead value, the week, 78,295; 4 mos.,			1,314,304

Average prices for ore in the district, by months, are shown in the following table:

ZINC ORE AT JOPLIN			LEAD ORE AT JOPLIN.		
Month.	1906.	1907.	Month.	1906.	1907.
January	47.38	45.84	January	75.20	83.53
February	47.37	47.11	February	72.83	84.58
March	42.68	48.66	March	73.73	82.75
April	44.63	48.24	April	75.13	79.76
May	40.51	.....	May	78.40	.....
June	43.83	.....	June	80.96	.....
July	43.25	.....	July	74.31	.....
August	43.56	.....	August	75.36	.....
September	42.58	.....	September	79.64	.....
October	41.55	.....	October	79.84	.....
November	44.13	.....	November	81.98	.....
December	43.68	.....	December	81.89	.....
Year	43.24	.....	Year	77.40	.....

Wisconsin Ore Market

Platteville, Wis., May 1—The zinc-ore market on the whole was satisfactory last week. Prices were not changed materially, the ruling quotation being $49 per ton for 60 per cent. zinc ore. Nearly all the ore produced was sold, but not loaded. A large percentage of all the ores is now being roasted, and this is attracting new buyers. A representative of one of the Joplin district smelters, not heretofore represented, is looking over the district and stated that a regular buyer would be located here before long.

Lead is now abundant and in good demand. The Federal people take nearly all of the production, last week's prices prevailing. Dry-bone and sulphur are scarce; prices not changed.

The shipment for the district, by camps, for the week ending April 27 was as follows:

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Mineral Point	70,700	80,380	.....
Linden	313,460	.....	.....
Platteville	358,144	.....	.....
Galena	163,000	.....	.....
Benton	21,359	.....	.....
Cuba City	191,440	.....	.....
Rewey	126,700	.....	.....
Livingston	99,000	.....	.....
Buncombe-Hazel Green	399,400	.....	.....
Total for week	1,743,203	80,380	.....
Year to April 27	29 327,797	1,310,370	143,160

Owing to the shortage of cars several of the camps were unable to ship all the ore produced.

Mining Stocks

New York, May 1—The general stock markets have fluctuated in rather a meaningless way, and are evidently depending mainly on professional trading for the most part. The curb market has been dull, without any serious changes in price. The dealing in mining stocks on the Produce Exchange is increasing slowly, but has not yet assumed much importance.

A sale of 100 shares of Homestake, of South Dakota, was reported at $56 per share, a drop of $19 from the last reported transfer.

Boston

April 30—It has been another quiet week in the mining share market, and as a rule some improvement is to be noted in prices. Monetary conditions are greatly improved locally, with rates from 4½ to 5½ per cent. for carrying. The Copper Range suit against A. C. Burrage and T. W. Lawson for accounting in the Trimountain suit, after being in court for two or three days, was settled out of court after some rather spicy testimony. The Copper Range report, issued today, concludes in this manner: "All litigation between this company and Albert C. Burrage has been settled by agreement of the parties, with the result that under the terms of this settlement Mr. Burrage pays to this company the entire amount of the Trimountain debt—$840,000—assumed under agreement of Aug. 25, 1903."

The day of this settlement Copper Range jumped $1.75 to $82.25. The final tonight is a trifle above a week ago at $81.87½. Amalgamated is a trifle better at $95 ex-dividend. It has sold both above and below this.

The Old Dominion Company of New Jersey has decided to increase its capital by 12,000 shares and will offer it to stock-

holders at $50. Inasmuch as the Old Dominion Company of Maine owns about fifteen-sixteenths of the stock of the New Jersey company it will be obliged to take substantially all of the increase. The Maine company will probably make a similar increase on the same terms.

Colorado Springs

April 27—Trading on the local mining exchange has been dull and featureless during the entire week. The recent heavy snows in the Cripple Creek district have retarded mining operations to some extent, and interfered with the transportation of the ore from the mines. To this can be attributed, to some extent, the extreme dullness of the stock market.

STOCK QUOTATIONS

NEW YORK	Apr. 30
Name of Comp.	Clg.
Alaska Mine	3/8
Am.Nev.M.&P.Co.	....
Amalgamated	95
Anaconda	62 5/8
Balaklala	10 3/8
British Col. Cop.	8 3/8
Buffalo Cobalt	2 7/8
Butte & London	....
Butte Coalition*	27 1/4
Butte Cop. & Zinc	....
Cobalt Contact	9/16
Colonial Silver	3
Cum. Ely Mining	9
Davis Daly	16
Dominion Cop	6 3/8
El Rayo	5 3/4
Foster Cobalt	1 1/4
Furnace Creek	1 1/4
Giroux Mine	9
Gold Hill	1 7/8
Grauby, New	15
Greene Gold	1 5/8
Greene G. & S	1 3/4
Greenw'r & D.Val.	1
Guanajuato	4
Guggen. Exp.	230
Hanapah	1/4
McKinley Dar.	1 1/8
Micmac	4 3/8
Mines Co. of Am.	1 3/4
Mitchell Mining	4 5/8
Mont.Sho. C.(New)	9 3/4
Nev. Utah M. & S.	5 7/8
Newhouse M. & S.	....
Nipissing Mines	14 1/8
Old Hundred	3 3/4
Silver Queen	1 1/8
Stewart	2 1/2
Tennessee Copper	....
Union Copper	1
Utah Apex	6
West Columbus	12

N. Y. INDUSTRIAL	
Am. Agri. Chem.	20
Am. Smelt. & Ref.	134 3/4
Am. Sm. & Ref., pf.	108 3/4
Bethlehem Steel	12
Colo. Fuel & Iron	36
Federal M.& S., pf.	87
Inter. Salt	....
National Lead	62 1/2
National Lead, pf.	99
Pittsburg Coal	11 7/8
Republic I. & S.	29
Republic I.& S.,pf.	85 1/8
Sloss-Sheffield	55 3/4
Standard Oil	526
Tenn. C. & I.	147 3/8
U. S. Red. & Ref.	18 1/2
U. S. Steel	38
U. S. Steel, pf.	101 1/2
Va. Car. Chem	28 3/4
Va. I. Coal & Coke	70

ST. LOUIS	Apr. 27	
N. of Com.	High.	Low.
Adams	.40	.30
Am. Nettie	.03	.05
Center Cr'k	2.25	2.00
Cent. C. & C.	66.00	65.00
C.C. & C. pd.	78.00	77.00
Cent. Oil	130.00	120.00
Columbia	5.00	4.50
Con. Coal	27.50	25.00
Doe Run	140.00	125.00
Gar. Bimet.	.30	.23
St. Joe	18.00	16.00

BOSTON	Apr. 30
Name of Comp.	Clg.
Adventure	3 3/4
Allouez	51 1/2
Am. Zinc	39 1/4
Arcadian	7 1/4
Atlantic	13 3/8
Bingham	18 1/2
Boston Con.	29
Calumet & Ariz.*	173
Calumet & Hecla*	840
Centennial	31
Con. Mercur	.38
Copper Range	81 7/8
Daly-West	16 1/8
Franklin	17 3/4
Greene—Can. ctfs.	16 1/2
Isle Royal	19
La Salle	17
Mass	6 3/4
Michigan	15
Mohawk	86
Mont. C. & C.(new)	2 3/4
Nevada	14 1/4
North Butte	86 3/4
Old Colony	1 1/8
Old Dominion	54 3/4
Osceola	140
Parrot	22 3/4
Phoenix	1 3/4
Quincy*	126
Rhode Island	5 7/8
Santa Fe	3 1/8
Shannon	17 3/4
Tamarack*	110
Trinity	22 1/4
United Cop., com.	61 3/8
U. S. Oil	10 3/8
U. S. Smg. & Ref.	55
U.S.Sm.& Re.,pd.*	45
Utah Copper	63 1/4
Victoria	8 1/8
Washington	....
Winona	8 1/2
Wolverine	160
Wyandotte	1 1/8

*Ex. Div. †Ex. Rights.

BOSTON CURB	
Ahmeek	85
Ariz. Com	24
Black Mt.	5 7/8
Cananea Cent	....
East Butte	10
Hancock Con	9
Keweenaw	10 1/4
Majestic	33 1/4
Raven	1 3/4
Shawmut	.63
Superior	....
Superior & Pitts.	18 3/4
Troy Man	2

LONDON	May 1		
Name of Com.	Clg.		
Dolores	£1	10s	0d
Stratton'sInd.	0	3	6
Camp Bird	2	4	0
Esperanza	1	18	9
Tomboy	2	0	0
El Oro	1	8	1
Oroville	0	16	10 1/2
Somera	1	1	3
Utah Apex	1	8	9
Ariz.Cop.,pfd.	3	6	6
Ariz.Cop.,def.	3	3	0

Cabled through Hayden, Stone & Co., N. Y.

S. FRANCISCO	Apr. 25
Name of Comp.	Clg.
COMSTOCK STOCKS	
Belcher	.55
Best & Belcher	1.35
Caledonia	.42
Challar	.17
Con. Cal. & Va	1.00
Crown Point	.30
Exchequer	.70
Gould & Curry	.37
Hale & Norcross	.75
Mexican	.83
Ophir	2.35
Overman	.15
Potosi	.11
Savage	.92
Sierra Nevada	.55
Union	.55
Utah	.04
Yellow Jacket	1.00
TONOPAH STOCKS	
Golden Anchor	.37
McNamara	.48
Montana-Pitts.ex.	.18
North Star	.40
Rescue	.17
GOLDFI'D STOCKS	
Black Ants	.12
Blue Bull	.51
Columbia Mt.	1.02
Comb. Frac	5.37
Conquerer	.22
Daisy	2.30
Florence	6.87
Frances-Mohawk	1.40
Goldfield Con.	8.50
Grandma	.30
Great Bend	1.20
Red Hills	.69
St. Ives	1.60
BULLFROG STOCKS	
Amethyst	.45
Bonnie Claire	.45
Mayflower Con.	.55
Montgomery Mt.	.25
Original	.17
MANHAT'N STOCKS	
Gold Wedge	.11
Manhattan Mg.	.12
Pine Nut	.17
Ruby Wonder	.31
Stray Dog	.23
Yellow Horse	.07

NEVADA (Weir Bros. & Co., New York)	May 1
TONOPAH STOCKS	Clg.
Tono'h Mine of N.	18.00
Tonopah Exten.	3.06 1/2
Montana Tonop'h	3.50
Belmont	4.50
Tonopah Midway	1.60
West End Con.	1.25
Jim Butler	1.14
GOLDFI'D STOCKS	
Sandstorm	.69
Kendall	.45
Red Top	4.25
Jumbo	4.25
Goldfield Mining	1.55
Dia'dfield B. B. C.	.38
Atlanta	.73
Mohawk	16.00
Silver Pick	1.14
Laguna	1.65
BULLFROG STOCKS	
Mont. Shoshone C.	10.00
Tramps Con.	.87
Gold Bar	.97
Bullfrog Mining	.26
Bullfrog Nat. B.	.37
Homestake Con.	....
MANHAT'N STOCKS	
Manhattan Con.	.73
Manhat'n Dexter	.20
Jumping Jack	.16
Stray Dog	.23
Indian Camp	.14

COLO. SPRINGS	Apr. 27
Name of Comp.	Clg.
Acacia	9
Black Bell	....
C. C. Con	....
Dante	....
Doctor Jack Pot	7 1/8
Elkton	56 1/2
El Paso	45
Findlay	67
Gold Dollar	7 1/8
Gold Sovereign	6 7/8
Isabella	23 1/2
Index	....
Jennie Sample	....
Jerry Johnson	4
Mary McKinney	58 1/8
Pharmacist	6 1/2
Portland	1.18
Un. Gold Mines	8 1/4
Vindicator	....
Work	19 7/8

New Dividends

Company.	Payable.	Rate.	Amt.
Amalgamated Copper	May 27	$2.00	$3,061,758
Beck Tunnel, Utah	Apr.	0.04	40,000
Consolidation Coal	Apr. 30	1.50	153,750
Grand Central, Utah	Apr.	0.10	25,000
Inter. Nickel, pfd	May 1	1.50	131,123
Kendall, Mont.	Apr. 23	0.03	15,000
Mary McKinney, Colo.	Apr. 25	0.03	39,128
Mines Co. of America	Apr. 26	0.02	40,000
New Central Coal, Md.	May 1	0.40	20,000
Nipissing, Ont.	Apr. 20	0.15	180,000
N. Y. & Hon. Rosario	Apr. 20	0.10	15,000
Penna. Steel, pfd	May 1	3.50	588,749
Philadelphia Co.	May 1	0.75	434,296
Pocahontas Collieries, pfd.	May 1	1.50	22,500
Tenn. Coal, Iron & R.R	May 1	1.00	225,536
Tenn. C. I. & R.R., pfd.	May 1	2.00	4,960
Tonopah Co., Nev.	Apr. 22	0.35	350,000
United Copper	Apr. 29	1.75 1/2	787,500
United Copper, pfd.	May 15	3.00	150,000
United Zinc	Apr. 15	0.50	9,778
U.S. Cast Iron Pipe & Fdy.	June 1	1.00	150,000
U.S. C. I. Pipe & Fdy, pfd.	June 1	1.75	262,500
U. S. Steel Corp.	July 1	0.50	2,541,513
U. S. Steel Corp., pf.	May 31	1.75	6,304,919
Vindicator Con., Colo.	Apr. 25	0.03	45,000

Assessments

Company.	Delinq.	Sale.	Amt.
Belcher, Nev.	Apr. 16	May 9	$0.15
Caledonia, Nev.	Apr. 10	May 1	0.10
Chollar, Nev.	Apr. 22	May 16	0.10
Confidence	Apr. 23	May 14	0.20
Con. Imperial, Nev.	May 7	May 29	0.01
Con.St.Gothard,Cal.	Apr. 24	May 14	0.10
Gould & Curry, Nev.	Apr. 10	May 1	0.10
Hale & Norcross, N.	Apr. 3	Apr. 30	0.15
Lost Packer, Idaho	May 6	May 27	1.00
Lucky Dutch'n, Nev	May 4	May 25	0.01
Morrison, Utah	Apr. 16	May 10	0.01
Overman, Nev.	May 17	June 7	0.10
Potosi, Nev.	May 13	June 5	0.10
Union Con., Nev	May 8	May 29	0.10
Utah & N. Y., Utah	Apr. 27	May 16	0.01
Yellow Jacket, Nev.	Apr. 13	May 22	0.10

Monthly Average Prices of Metals

AVERAGE PRICE OF SILVER

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January	65.288	68.673	30.119	31.769
February	66.108	68.835	30.464	31.852
March	64.597	67.519	29.854	31.325
April	64.765	65.462	29.984	30.253
May	66.976	....	30.968	...
June	65.394	....	30.185	.....
July	65.105	.....	30.113	.....
August	65.949	.....	30.529	.....
September	67.927	....	31.483	.....
October	69.523	.....	32.148	.....
November	70.813	.....	32.671	.....
December	69.050	.....	32.003	.....
Year	66.791	.....	30.868	.....

New York, cents per fine ounce; London, pence per standard ounce.

AVERAGE PRICES OF COPPER

	NEW YORK.				LONDON.	
	Electrolytic		Lake.			
	1906.	1907.	1906.	1907.	1906.	1907.
January	18.310	24.404	18.419	24.825	78.869	106.739
February	17.869	24.869	18.116	25.236	78.147	107.356
March	18.361	25.065	18.641	25.560	81.111	106.594
April	18.375	24.224	18.688	25.260	84.793	98.625
May	18.475	.....	18.724	....	84.867	...
June	18.442	.....	18.719	.....	83.994	.....
July	18.190	....	18.585	.....	81.167	.....
August	18.380	....	18.706	.....	83.864	..
September	19.033	.....	19.328	.	87.831	.....
October	21.203	.....	21.722	.....	97.269	.....
November	21.833	.....	22.398	.....	100.270	.....
December	22.885	.....	23.350	.....	105.226	.....
Year	19.278	.....	19.616	.....	87.282	.....

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

AVERAGE PRICE OF TIN AT NEW YORK

Month.	1906.	1907.	Month.	1906.	1907.
January	36.390	41.548	July	37.275	.....
February	36.403	42.102	August	40.606	.....
March	36.662	41.313	September	40.516	.....
April	38.900	40.938	October	42.852	.....
May	43.313	.....	November	42.906	.....
June	39.260	.....	December	42.750	.....
			Av. year	39.819	.....

Prices are in cents per pound.

AVERAGE PRICE OF LEAD

Month.	New York.		London.	
	1906.	1907.	1906.	1907.
January	5.600	6.000	16.850	19.828
February	5.464	6.000	16.031	19.531
March	5.350	6.000	15.922	19.703
April	5.404	6.000	15.959	19.975
May	5.685	.....	16.725	.....
June	5.750	.....	16.813	.....
July	5.750	.....	16.525	.....
August	5.750	....	17.109	.....
September	5.750	.....	18.266	.....
October	5.750	.....	19.350	.....
November	5.750	.....	19.281	.....
December	5.900	.....	19.609	.....
Year	5.657	.....	17.370	.....

New York, cents per pound. London, pounds sterling per long ton.

AVERAGE PRICE OF SPELTER

Month.	New York.		St. Louis.		London.	
	1906.	1907.	1906.	1907.	1906.	1907.
January	6.487	6.732	6.337	6.582	28.225	27.125
February	6.075	6.814	5.924	6.664	25.844	25.938
March	6.209	6.837	6.056	6.687	24.563	26.094
April	6.078	6.685	5.931	6.535	25.781	25.900
May	5.997	....	5.846	.....	27.000	....
June	6.096	.....	5.948	.....	27.728	.....
July	6.006	.....	5.856	.....	26.800	.....
August	6.027	.....	5.878	.....	26.938	.....
September	6.216	....	6.056	.....	27.563	.....
October	6.222	.....	6.070	.....	28.075	.....
November	6.375	....	6.225	.....	27.781	.....
December	6.593	.....	6.443	....	27.938	.....
Year	6.198	.....	6.048	.....	27.020	.....

New York and St. Louis, cents per pound. London in pounds sterling per long ton.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

ABRASIVES—		
Bort, good drill quality, carat		$85.00
Carborundum, f.o.b. Niagara Falls, powd	lb.	.08
Grains	"	.10@.17
Corundum	"	.07@.10
Crushed Steel, f.o.b. Pittsburg	"	.05¾@.06
Emery, in kegs: Turkish flour	"	.01½@.02½
Grains	"	.03½@.04½
Naxos flour	"	.01½@.02½
Grains	"	.03½@.04½
Chester flour	"	.01½
Grains	"	.03½@.04½
Peekskill, f.o.b. Easton, Pa., flour	"	.01½@.01½
Grains, in kegs	"	.02½@.02½
Garnet, per quality	sh ton	25.00@35.00
Pumicestone, Am. Powd. 100	lb.	1.60@2.00
Italian, powdered	"	.01¼@.01½
Lump, per quality	"	.03@.20
Rottenstone, ground	"	.02½@.04½
Lump, per quality	"	.05@.25
Rouge, per quality	"	.05@.30
Steel Emery, f.o.b. Pittsburg	"	.07½@.07¾
ACIDS—		
Acetic 28%	lb.	.02¼@.02½
Boric	"	.09¾@.10
Hydrofluoric, 30%	"	.02¾@.03
" 48%	"	.06
" 60%	"	.10
Hydrochloric acid, 20°	per lb.	1.25@1.50
Nitric acid, 38°	per lb.	4.25@4.62½c.
Sulphuric acid, 50°, bulk, per ton		$12 up.
60°, 100 lb. in carboys		.85@1.12½
60°, bulk, ton		16.00@18.00
66°, 100 lb. in carboys		1.00@1.25
66°, bulk, ton		18.00@20.00
Oxalic	"	.08¼@.09
ALCOHOL—Grain	gal.	2.46½
Refined wood, 95@97%	"	.70@.75
ALUM—Lump	100 lb.	$1.75
Ground	"	1.85
Chrome Alum	lb.	.04¼
ALUMINUM—Sulphate, com'l.	"	1.25@1.60
AMMONIA—24 deg.	lb.	.04¼@.05½
" 26 "		.04¾@.05¾
AMMONIUM—		
Bromide	lb.	.23
Carbonate	"	.07½@.08
Muriate grain	"	.06¼@.06¾
Lump	"	.09½@.09½
Sulphate, 100 lb		3.05@3.10
Sulphocyanide com	"	.30
" " chem. pure	"	.40
ANTIMONY—needle, lump	lb.	.12@.13
ARSENIC—White (nominal)	"	.07¼@.07½
Red	"	.07½@.07⅝
ASPHALTUM—		
Barbadoes	per ton.	40.00@80.00
West Indies	"	20.00@60.00
Egyptian	lb.	.08@.14
Gilsonite, Utah	ordinary per ton.	50.00
Trinidad	"	30.00@40.00
California	"	20.00@35.00
BARIUM—		
Carb. Lump, 80@90%	lg. ton.	30.00@35.00
Powdered, 80@90%	lb.	.02@.02½
Chloride com'l	ton.	37.50@40.00
Nitrate, powdered, in casks	lb.	.06
Sulphate (Blanc Fixe)	"	.02¼
BARYTES—		
Am. Ground	sh. ton.	14.50@21.00
Floated	"	22.00
Foreign floated	"	19.50@22.50
BISMUTH—Sub-nitrate	lb.	1.50
BLEACHING POWDER—35%, 100 lb.		1.30@1.50
BLUE VITRIOL—(copper sulphate), carload, per 100 lb		7.50
BONE ASH	lb.	.02½@.03
BORAX	"	.07¼@.07¾
CALCIUM—Acetate, gray	"	2.35@2.40
Acetate, brown	"	1.60@1.65
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton.	65.00
Chloride, f.o.b. N. Y.	"	16.00@18.00
CEMENT—		
Portland, Am, 500 lb	bbl.	1.55@1.60
Foreign	"	2.25@2.90
"Rosendale," 300 lb	"	.85
(in sacks)		.65
Slag cement	"	.75@1.25
CHROME ORE—		
New Caledonia 50% ex. ship N. Y.	per lg. ton	17.50@20.00
Bricks, f.o.b. Pittsburg, M.	"	175.00
CLAY, CHINA—Am. common ex-dock, N. Y.	"	8.00@9.00
Foreign	"	11.50@17.50
COBALT—Oxide	lb.	2.50
COPPERAS—Bulk	100 lb.	$0.55
In bbls	"	.65@.75
In bags	"	.60@.70
CRYOLITE	lb.	.06½
FELDSPAR—Ground best	sh. ton.	7.00@15.00
FIRE BRICK.		
American	per M.	30.00@40.00
Imported	"	26.00@45.00
St. Louis No. 1	"	16.00
" No. 2	"	14.00
Extra	"	20.00@23.00
FIRE CLAY.		
St. Louis mill	per ton	2.50
FLUORSPAR—		
Domestic f.o.b. shipping port:		
Lump	lg. ton.	8.00@10.00
Ground	"	11.50@13.50
Gravel	"	4.25@4.50
Foreign crude ex. dock		8.00@10.00
FULLER'S EARTH—Lump	100 lb.	.80@.85
Powdered	"	.85@.90
GRAPHITE—		
American, ore, common	lb.	.01@.10
Artificial	"	.06
Ceylon, common pulv	"	.02½@.03½
Best, pulverized	"	.04@.08
German, com. pulv	"	.01½@.01½
Best, pulverized	"	.01½@.02
Italian, pulverized	"	.01@.02
GYPSUM—		
Fertilizer	"	7.00
Rock	lg. ton.	4.00
INFUSORIAL EARTH—		
Ground Am. best	lb.	.01¾
French	lg. ton.	55.00
German	lb.	.02½@.02⅝
LEAD—Acetate (sugar of)	lb.	.07¾
Nitrate, com'l	"	.08½@.09
MAGNESITE—Greece.		
Crude (95%)	lg. ton.	7.00@8.00
Calcined, powdered	sh. ton.	30.00@40.00
Bricks, domes, per qual. f.o.b. Pittsburg	M.	160@200
MAGNESIUM—		
Chloride, com'l	100 lb.	.80@1.15
Sulphate (Epsom salt)	100 lb.	.90@1.00
MANGANESE—		
Crude powdered:		
70@75% binoxide	lb.	.03
75@85% binoxide	"	.03½
85@90% binoxide	"	.05
90@95% binoxide	"	.06½
Ore, 80%–85%	sh. ton.	35.00@45.00
MARBLE—Flour	sh. ton.	9.50@10.00
MINERAL WOOL—		
Slag, ordinary	"	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
MONAZITE SAND—		
Guar. 97%, with 5% Thorium oxide, nominal	lb.	.08 and up.
NICKEL—		
Oxide, crude, lb. (77%) for fine metal contained		.47
Sulphate, single	lb.	.13@.18
" double	"	.09@.13
NITRATE OF SODA—100 lb. 96% for 1907		2.50
95% for 1908		2.45
95% for 1909		2.40
96% is 5c higher per 100 lb.		
OZOKERITE—best	lb.	.14@.17
PAINTS AND COLORS—		
Litharge, Am. powdered	"	.07½@.07¾
English glassmakers'	"	.08½@.08⅝
Lithopone	"	.04½@.05
Metallic, brown	sh. ton.	19.00
Red	"	16.00
Ocher, Am. common	"	8.50@9.00
Best	"	16.00
Dutch, washed	lb.	.02½@.03
French, washed	"	.01½@.02½
Paris green, pure, bulk	"	.21@.23
Red lead, American	"	.07½@.07¾
Foreign	"	.08½@.08¾
Turpentine, spirits bbl., per gal.		.75@.78
White lead, Am., dry	lb.	.06⅝@.06¾
American, in oil	"	.07½@.07¾
Foreign, in oil	"	.09⅝@.10
Zinc white, Am. extra dry	"	.05½@.05½
Foreign, red seal, dry	"	.07½@.07¾
Green seal, dry	"	.07½@.08½
PHOSPHATES—Acid	.65@67½c per unit	
*Fla., hard rock		7.50
land pebble 68%		4.50
†Tenn., 78@80%		6.50@7.00
78%		5.50
75%		5.00
68@72%		4.50
‡So. Car. land rock		6.00
" " river rock		....
POTASSIUM—		
Bicarbonate crystal	lb.	$0.8½@.09
Powdered or granulated	"	.09@.09½
Bichromate, Am	"	.08½@.08½
Scotch	"	.11
Bromide	"	.16
Carbonate (80@85%)	"	.03½@.04
Caustic, ordinary	"	.04½@.05½
Elect. (90%)	"	.05½
Chloride (muriate), 100 lb		1.90
Chlorate, powdered	"	.09½@.09½
Crystals	"	09@09½
Cyanide (98@99%)	"	.18@.19
Kainite, long ton, bulk, 8.50; bags, 9.50.		
Permanganate	lb.	10@10½
Prussiate, yellow	"	.16@.16½
Red	"	.38@.38
Sulphate	100 lb.	2.18½@2.21½
PYRITE—		
Domestic, non-arsenical, furnace size, f.o.b. mines	per unit	11@11½c
Domestic, non-arsenical, fines, per unit, f.o.b. mines		10@10½c.
Imported non-arsenical, furnace size, per unit		.13@.13½
Imported, arsenical, furnace size, per unit		12@12½c.
Imported fines, arsenical, per unit.		8½@9c.
" " non-arsenical, per unit		10½@11c.

Pyrite prices are per unit of sulphur. An allowance of 25c. per ton is made when delivered in lump form.

SALT—N. Y. com. fine 280 lb.	bbl.	.72@1.15
N. Y. agricultural	sh. ton.	3@4.40
SALTPETER—Crude	100 lb.	3.75@4.00
Refined, crystals	"	5.25@5.75
SILICA—		
Ground quartz, ord'ry	lg. ton	13.00@15.00
Silex	"	13.00@30.00
Lump Quartz	"	2.50@4.00
Glass sand	"	2.75
SILVER—Nitrate, crystals	oz.	.43½@.45¼
SODIUM—		
Acetate	lb.	.04@.04½
"Alkali," per 100 lb., 58/48		.80@.87½
Bicarb. soda, per 100 lb		1.20@1.50c.
Soda, caustic, per 100 lb., 76/60		1.80@1.90
" " powdered		.02¾@.03½
Salt cake, per 100 lb		.65@.85
Soda, monohydrate, per lb		1½c.
Bichromate	lb.	.06½@.06¾
Bromide	"	.16
Chlorate, com'l	"	.08½@.09
Cyanide, ("100% KCN")	"	.18@.19
Hyposulphite, Am	"	1.35 up
German	"	1.60@1.70
Phosphate	100 lb.	1.80@1.90
Prussiate	"	.10½@.11
Sal soda, f.o.b. N. Y	100 lb.	.70@.75
Foreign, f.o.b. N. Y.	"	.80@1.00
Silicate, com'l	100 lb.	.75@1.15
Sulphate, com'l, (Glauber's salt)	100 lb.	.45@.50
" " calcined		.01@.01⅛
STRONTIUM—Nitrate	lb.	.08½@.08½
SULPHUR—		
Louisiana (prime) to New York, Boston or Portland	lg. ton	22.12½
To Philadelphia or Baltimore	"	22.50
Roll	100 lb.	1.85@2.15
Flour	" "	2.00@2.40
Flowers, sublimed	" "	2.20@2.60
TERRA ALBA—French & Eng.	100 lb.	.90@1.00
TALC—Domestic	sh. ton.	15.00@20.00
French, best	"	20.00@25.00
Italian, best	"	35.00@40.00
TIN—Bi-chloride, 50%	lb.	.12½
Crystals	"	.25 up
Oxide, lb		.47@.49
URANIUM—Oxide	"	3.50
ZINC—Metallic ch. pure	"	.15
Chloride solution, com'l	"	.02½@.04
Chloride, granular	"	.04½@.05
Dust	"	.05½@.06½
Sulphate	"	.02½@.02¾

*F. o. b. Florida or Georgia ports. †F. o. b. Mt. Pleasant. ‡On vessel Ashley River, S. C.

Note—These quotations are for wholesale lots in New York, unless otherwise specified, and are generally subject to the usual trade discounts. Readers of THE ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

DIVIDENDS.

Metal and Mining Companies—U. S.

Name of Company and Location.		Author-ized Capital	Shares. Issued.	Par Val.	Dividends. Total to Date.	Latest. Date.	Amt.
Alaska Mexican, g.	Al'ka	$1,000,000	180,000	$ 5	$1,572,381	Jan. 1907	$ .50
Alaska Treadwell,g.	Al'ka	5,000,000	200,000	25	9,235,000	Jan. 1907	1.00
Alaska United, g.	Al'ka	1,000,000	180,200	5	306,340	Jan. 1907	0.30
Amalgamated, c,.	Mont	155,000,000	1,530,879	100	50,584,788	May 1907	2.00
Am.Sm.&Ref.,com.	U. S.	50,000,000	500,000	100	9,625,000	Apr. 1907	1.75
Am. Sm. & Ref. pf.	U. S.	50,000,000	500,000	100	23,588,053	Apr. 1907	1.75
Am. Smelters, pf. A	U. S.	17,000,000	170,000	100	1,430,000	Mar. 1907	1.50
Am. Smelters. pf. B	U. S.	30,000,000	300,000	100	2,625,000	Mar. 1907	1.25
Anaconda,c.	Mont	30,000,000	1,200,000	25	34,850,000	Apr. 1907	1.75
Annie Laurie, g.	Utah	5,000,000	25,000	100	465,061	July 1905	.50
Arizona, c.	Ariz	3,775,000	3,682,520	.....	6,182,361	Apr. 1906	.05
Atlantic, c.	Mich	2,500,000	100,000	25	990,000	Feb. 1905	.02
B. & H., l. z.	Mo	400,000	400,000	1	40,000	Dec. 1905	.01
Beck Tunnel, g.s.l.	Utah	100,000	1,000,000	0.10	495,000	Apr. 1907	.40
Bingham & N.H.,c.g	Utah	2,000,000	226,000	5	22,600	Sept. 1906	.10
Boston & Montana.	Mont	3,750,000	150,000	25	47,875,000	Nov. 1906	12.00
Bull.Beck.&Cham.g	Utah	1,000,000	100,000	10	2,558,400	Apr. 1907	.10
Bunker Hill & Sull.	Ida	3,000,000	300,000	10	8,586,000	Apr. 1907	.60
Butte Coalition,c.s.	Mont	15,000,000	1,000,000	15	1,300,000	Mar. 1907	.50
Calumet & Arizonac	Ariz	2,500,000	200,000	10	7,000,000	Mar. 1907	5.00
Calumet & Hecla,c.	Mich	2,500,000	100,000	25	101,400,000	Mar. 1907	20.00
Camp Bird, g., s.	Colo	5,500,000	820,000	5	3,784,300	Apr. 1907	.24
Carisa, c.g.	Utah	500,000	500,000	1	55,000	Nov. 1906	.01
Central Eureka, g.	Cal	400,000	398,425	1	778,921	Mar. 1906	.07
Columbus Con. c.	Utah	1,500,000	300,000	5	105,000	Apr. 1907	.20
Combi'tion Co.G'f'd	Nevada	400,000	320,000	1	688,000	Sept. 1906	.15
Con. Mercur, g.	Utah	1,000,000	1,000,000	1	1,205,000	Dec. 1906	.02½
Continental, z. l.	Mo	550,000	22,000	25	187,000	Jan. 1907	.50
Copper Range Con.	Mich	38,500,000	383,781	100	4,558,896	Apr. 1907	2.00
Creede United, g.	Colo	2,000,000	1,625,000	1	214 053	July 1906	.00½
Cripple Creek Con.g	Colo	2,000,000	2,000,000	1	180,000	Mar. 1905	.00½
Daly Judge, g. s. l.	Utah	300,000	300,000	1	225,000	Apr. 1907	.37½
Daly West, g. s. l.	Utah	3,600,000	180,000	20	5,607,000	Mar. 1907	.60
De Lamar, g. s	Ida	400,000	67,180	5	2,926,370	May 1905	.72
Dillon, g.	Colo	1,250,000	1,250,000	1	21,875	July 1905	.01
Doctor Jack Pot.	Colo	3,000,000	3,000,000	1	268,000	July 1906	.00½
Doe Run, l.	Mo	10,000,000	59,062	100	1,257,851	Apr. 1907	.50
Elkton Con., g.	Colo	3,000,000	2,500,000	1	1,841,960	Feb. 1907	.01½
El Paso, g.	Colo	2,500,000	2,450,000	1	1,022,750	June 1906	.01
Fed. Sm., com.	Idaho	10,000,000	60,000	100	2 048,750	Mar. 1907	5.00
Federal Sm., pf.	Idaho	20,000,000	120,000	100	2,651,250	Mar. 1907	1.75
Findley, g.	Colo	1,250,000	1,250,000	1	325,000	Aug. 1906	.01
Frances-Mohawk,g	Nevada	1,000,000	1,000,000	1	141,000	Dec. 1906	1.10
Gemini-Keystone	Utah	500,000	5,000	100	1,850,000	July 1906	10.00
Gold King Con	Colo	5,750,370	5,750,370	1	1,407,504	May 1905	.01
Gold Sovereign	Colo	2,000,000	2,000,000	1	10,000	Jan. 1905	.00½
Grand Central, g.	Utah	250,000	250,000	1	1,186,000	Apr. 1907	.10
Gwin Mine, Dev., g.	Cal	1,000,000	100,000	10	35,000	Mar. 1906	.25
Hecla, s. l.	Idaho	250,000	1,000,000	0.25	870,000	Mar. 1907	.02
Homestake, g.	S. D.	21,840,000	218,400	100	22,244,040	Apr. 1907	.50
HornSilver,g.s.c.z.l	Utah	10,000 000	400,000	25	5,602,000	Mar. 1907	.05
Inter'l Nickel, pf.	N. Y.	12,000,000	87,415	100	655,613	May 1907	1.50
Iron Silver	Colo	10,000,000	500,000	20	4,000,000	Apr. 1907	.20
Jamison, g.	Cal	3,900 000	390,000	10	270,670	Apr. 1907	.03
Jerry Johnson.	Cal	2,500,000	2,500,000	1	61,700	Apr. 1906	.03
Kendall, g.	Mont	2,500,000	500 000	5	1,095,000	Apr. 1907	.03
Liberty Bell,g. s.	Colo	700,000	130,551	5	110,857	Jan. 1906	.15
Lightner, g.	Cal	125,000	102,255	1	295,694	Aug. 1905	.05
Mammoth, g. s. l.	Utah	10,000 000	400,000	25	2,080 000	Oct. 1906	.05
Mary McKinney, g.	Colo	1,500,000	1,304,252	1	801,765	Apr. 1907	.03
Mohawk, c.	Mich	2,500,000	100,000	25	900,000	Jan. 1907	4.00
Mont. Ore Purch.	Mont	2,500,000	80,833	25	9,437,274	Jan. 1907	15.00
Monument, g	Colo	300,000	300,000	1	27,124	Apr. 1905	.01
New Century, z., l.	Mo	300,000	300,000	1	211,500	Nov. 1906	.01
New Idria, q	Cal	500,000	100,000	5	900,000	Apr. 1907	.20
New Jersey Zinc	U. S.	10,000,000	100,000	100	8,400,000	Feb. 1906	3.00
North Butte.	Mont	6,000,000	400,000	15	4,200,000	Mar. 1907	2.00
North Star, g	Cal	2,500,000	250,000	10	1,336,989	Mar. 1907	.20
Northern Light,g.s.	Utah	2,000,000	400,000	5	20,000	Feb. 1904	.05
Old Dominion Cop.	Ariz	7,500,000	281,589	25	280,843	May 1906	.50
Old Gold	Colo	2,101,150	2,101,150	1	10,506	Mar. 1906	.05
Ophir, g. s	Nevada	302,400	100,800	3	1,797,400	July 1904	.25
Osceola, c	Mich	2,500,000	96,150	25	6,362,600	Jan. 1907	6.00
Parrot, c,s.	Mont	2,300,000	229,850	10	6,692,724	Mar. 1907	.25
Pennsylvania, g.	Cal	5,150,000	51,500	100	284,925	July 1905	.10
Platteville, l. z.	Wis	20,000	500	40	89,500	Oct. 1905	10.00
Portland, g.	Colo	3,000,000	3,000,000	1	7,387,080	Apr. 1907	.04
Quincy, c	Mich	3,750,000	110,000	25	16,965,446	Mar. 1907	4.50
Rob Roy, z.	Mo	15,000	15,000	1	9,600	May 1906	.03
Rocco Homest'k,l.s.	Nevada	300,000	300,000	1	112,000	Dec. 1905	.02
Sacramento, g, q.	Utah	5,000,000	1,000,000	1	245,000	Nov. 1906	.00½
Salvator, g. s. l.	Utah	200,000	200,000	1	6,500	Aug. 1904	.01
St. Joseph, l.	Mo	20,000,000	1,000,000	10	5,108,357	Mar. 1907	.15
Silver Hill, g. s	Nevada	108,000	108,000	1	59,400	Feb. 1906	.05
Silver King, g. s. l.	Utah	3,000,000	150,000	20	10,675,000	Dec. 1906	.33½
Shannon, c.	Ariz	3,000,000	300,000	10	300,000	Mar. 1907	.50
Snowstorm, s. l.	Ida	1,500,000	1,500,000	1	135,000	Jan. 1907	.03
Spearfish, g.	S. D.	1,500,000	1,500,000	1	165,500	Jan. 1905	.01½
Standard Con., g. s.	Cal	2,000,000	178,600	10	5,139,061	Mar. 1907	.10
Stratton'sIndepend	Colo	5,500,000	1,000,007	5	4,895,865	Apr. 1906	.12½
Tamarack, c	Mich	1,500,000	60,000	25	9,180,000	Jan. 1907	3.00
Tennessee, c.	Tenn	5,000,000	175,000	25	1,093,750	Jan. 1907	1.25
Tomboy, g. s	Colo	1,750,000	300,000	5	900,000	June 1906	.48
Tonopah of Nev.	Nevada	1,000,000	1,000,000	1	3,000,000	Apr. 1907	.35
Tonopah Belmont.	Nevada	2,000,000	1,295,007	1	518,003	Apr. 1907	.10
Tonopah Ext'nsion	Nevada	1,000,000	928,433	1	278,530	Apr. 1906	.15
Tonopah Midway.	Nevada	1,000,000	1,000,000	1	300,000	Jan. 1907	.05
Uncle Sam, g.s.l.	Utah	500,000	500,000	1	130 000	Oct. 1906	.01
United Cop. com.	Mont	75,000,000	450,000	100	5,175,000	Apr. 1907	1.75
United, c. pf	Mont	5,000,000	50,000	100	1,500,000	May 1907	3.00
United, z. l., com	Mo.-Kan.	500,000	92,400	5	27,450	Oct. 1903	.05
United, z. l., pf	Mo.-Kan.	500,000	19,556	25	283,250	Apr. 1907	.50
United, (Crip'le C'k)	Colo	5,000,000	4,009,100	1	280,071	Apr. 1905	.00½
United Verde, c.	Ariz	3,000,000	300,000	10	17,085,322	Dec. 1904	.75
Un.States,pf.g.s.c.l*	Utah	37,500,000	750,000	50	3,281,250	Apr. 1907	.87½
U.S. Red. & Ref. Pf	Colo	4,000,000	39,458	100	887,130	Apr. 1907	1.50
Utah, g.(Fish Sp'gs)	Utah	1,000,000	100,000	10	246,000	Apr. 1907	.03
Utah Con., c.	Utah	1,500,000	300,000	5	6,486,000	Apr. 1907	1.50
Victoria, Utah	Utah	250,000	250,000	1	87,000	Apr. 1907	.04
Vindicator Con., g.	Colo	1,500,000	1,500,000	1	1,605,000	Apr. 1907	.03
Wolverine, c.	Mich	1,500,000	60,000	25	4,050,000	Apr. 1907	10.00
Work, g	Colo	1,500,000	1,500,000	1	90,000	Apr. 1907	.01
YankeeCon	Utah	500,000	500,000	1	140,000	Jan. 1907	.03

*Previous to consolidation $1,436,250 were divided.

Coal, Iron and Other Industrials—United States.

Name of Company and Location.		Author-ized Capital.	Shares. Issued	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Ala. Con., C. & I., pf.	Ala	$2,500,000	24,638	100	$905,265	May 1905	$1.75
Allis-Chalmers, pf.	U. S.	25,000,000	200,000	100	3,213,750	Feb. 1904	1.75
Amer. Ag. Chem., pf.	U. S.	20,000,000	181,530	100	7,375,870	Apr. 1907	3.00
American Cement	Pa.	2,000,000	200,000	10	1,028,000	Jan. 1907	.40
American Coal	Md	1,500,000	50,000	25	2,195,000	Mar. 1907	7.50
Associated Oil	Cal	21,000,000	21,000,000	1	630,000	Aug. 1905	.01½
Bethlehem Steel, pf.	Pa.	15,000,000	150,000	100	900,000	Nov. 1906	.75
Cambria Steel	Pa.	50,000,000	900,000	50	8,212,500	Feb. 1907	.62½
Caribou Oil	Cal	100,000	80,000	1	56,000	July 1905	.07
Central C. & C., com.	Mo	5,125,000	51,250	100	1,921,875	Apr. 1907	1.50
Central C. & C., pf.	Mo	1,875,000	18,750	100	1,265,626	Apr. 1907	1.25
Central Oil	W. Va.	1,500,000	60,000	25	182,500	May 1904	.25
Claremont Oil	Cal	500,000	450,000	1	58,500	June 1905	.01
Col. & Hock. C. & I.	Ohio	7,000,000	69,244	100	173,086	Feb. 1905	.25
Consolidated Coal	Ill.	5,000,000	50,000	100	350,000	July 1904	1.00
Consolidation Coal	Md	10,250,000	102,500	100	8,955,400	Apr. 1907	1.50
Crucible Steel, pf	Pa.	25,000,000	250,000	100	1,000,000	Sept. 1906	1.50
Empire S. & I., pf.	N. J.	5,000,000	25,000	100	637,500	Jan. 1907	3.00
Fairmont Coal,	W. Va.	12,000,000	120,000	100	1,384,000	Feb. 1907	3.00
Four Oil	Cal	500,000	300,000	1	105.406	July 1905	.01
General Chem. com.	U. S.	12,500,000	74,103	100	1,745,125	Mar. 1907	2.00
General Chem., pf.	U. S.	12,500,000	100,000	100	4,540,178	Apr. 1907	1.50
George's C'k Coal	Md	2,500,000	22,000	100	1,188,000	July 1904	3.00
Imperial Oil	Cal	1,000,000	100,000	100	880,000	July 1905	.20
International Salt.	.....	30,000,000	182,280	100	927,060	Dec. 1906	1.00
Jeff. & Cl'f C. & I, cm	Pa.	1,500,000	15,000	100	330,000	Aug. 1905	5.00
Jeff. & Cl'f. C. & I.,pf	Pa.	1,500,000	15,000	100	825,500	Aug. 1906	2.50
Kern River Oil	Cal	2,000,000	20,000	100	39,500	May 1905	.13
Lehigh Coal & Nav.	Pa.	14,345,650	346,897	50	24,920,891	Nov. 1906	2.00
Maryland Coal,pf.	Md	2,000,000	18,850	100	1,517,160	Dec. 1906	4.00
Monon R. Coal, pf.	Pa.	10,000,000	100,000	100	3,154,945	Jan. 1906	.97
Monte Cristo Oil	Cal	500,000	500 000	1	120,000	July 1905	.01
National Carbon, pf.	U. S.	4,500,000	45,000	100	2,047,500	May 1905	1.75
National Lead, com.	N. Y.	15,000,000	149,054	100	1,788,648	Jan. 1907	1.00
National Lead, pf.	N. Y.	15,000,000	149,040	100	16,062,508	Mar. 1907	1.75
Nat'l Steel & Wire,pf.	N. Y.	5,000,000	25,778	100	631,561	May 1906	1.75
New Central Coal	Md	1,000,000	50,000	20	350,000	May 1907	.40
New River Coal, pfd.	W. Va.	4,000,000	37,617	100	112,851	May 1907	1.50
Pacific Coast Borax	Cal	2,000,000	19,000	100	2,086,500	Aug. 1905	1.00
Peerless Oil	Cal	1,000,000	92,000	10	396,320	May 1905	.14
Penna. Salt.	Pa.	3,000,000	60,000	50	14,528,000	Apr. 1907	3.00
Penna. Steel, pfd.	Pa.	25,000,000	168,214	100	7,615,744	May 1907	3.50
Phila. Gas, com	Pa.	28,953,029	579,061	50	6,684,142	Nov. 1905	.75
Phila. Gas, pf.	Pa.	5,744,813	114,896	50	1,583,505	Mar. 1905	1.25
Pittsburg Coal, pf.	Pa.	32,000,000	297,010	100	11,434,962	Apr. 1905	1.75
Pocahontas Coll., pf.	W. Va.	1,500,000	15,000	100	460,000	May 1907	1.50
Republic I. & S., pfd.	Ill.	25,000,000	204,169	100	4,136,612	Apr. 1907	3.75
Sloss-Sheffield, com.	Ala	7,500,000	75,000	100	750,250	Oct. 1906	2.50
Sloss-Sheffield, pf.	Ala	20,000,000	67,000	100	3,177,250	Mar. 1907	1.25
Standard Oil	U. S.	100,000,000	970,000	100	334,035,000	Mar. 1907	15.00
Tenn. C. & I., com	Tenn	22,553,600	225,536	100	2,906,425	Feb. 1907	1.00
Tenn. C. & I., pf.	Tenn	248,000	2,480	100	380,090	Feb. 1907	2.00
Texas & Pacific Coal.	Texas	2,000,000	20,000	100	1,930,000	Mar. 1905	2.00
Thirty-three Oil.	Cal	500,000	100,000	5	430,000	July 1905	.10
Union Oil	Cal	10,000,000	100,000	100	1,118,766	May 1905	.50
U. S. SteelCorp.,cm.	U. S.	550,000,000	5,083,025	100	63,500,028	Mar. 1907	.50
U. S. Steel Corp., pf.	U. S.	360,281,100	3,603,141	100	174,844,308	Feb. 1907	1.75
Va. Carolina Ch., pf.	U. S.	20,000,000	180,000	100	11,820,869	Apr. 1907	2.00
Westmoreland Coal.	Pa.	3,000,000	60,000	50	8,580,000	Oct. 1905	2.50

Canada, Mexico, Central and South America.

Name of Company and Location.		Author-ized Capital.	Shares. Issued.	Par Val. $	Dividends. Total to Date.	Latest. Date.	Amt.
Amistad y Conc'rdia.	Mex	$480,000	9,600	50	$258,064	Jan. 1905	$1.71
Buffalo, s.	Ont.	1,000,000	900,000	100	81,000	Apr. 1907	.03
Butters' Salvador, g.	Salv	750,000	150,000	5	600,000	Apr. 1905	.25
Cariboo McKin'y, g.	B. C.	1,250,000	1,250,000	1	546,837	Feb. 1904	.04
Consolidated M & S.	B. C.	5,500,000	48,338	100	594,100	May 1907	2.50
Copiapo, c.	Chile	1,125,000	112,500	10	3,000,900	Oct. 1904	1.20½
Crow's Nest Pass	B. C.	3,500,000	140,000	25	1,581,148	Apr. 1906	.62½
Dominion Coal, com.	N. S.	15,000,000	150,000	100	2,100,000	Apr. 1907	1.00
Dominion Coal, pf.	N. S.	3,000,000	30,000	100	3,330,000	Jan. 1905	4.00
Dos Estrellas, g. s.	Mex	150,000	3,000	50	1,020,555	July 1905	13.65
El Oro, g. s.	Mex	5,750,000	1,080,000	5	2,708,800	July 1904	.15
Esperanza, s. g.	Mex	2,275,000	455,000	5	6,121,049	Apr. 1907	1.32
Foster Cobalt, s.	Ont.	1,000,000	1,000,000	1	50,000	Jan. 1907	.05
Granby Con	B. C.	15,000,000	1,350,000	10	2,158,630	Mar. 1907	.30
Greene Con. Copper.	Mex	8,640,000	864,000	10	5,814,200	Mar. 1907	.40
Greene Con. Gold.	Mex	5,000,000	500,000	10	300,000	July 1905	.20
GreenGold-Silv'r,pfd	Mex	3,000,000	300,000	10	120,000	Mar. 1907	.40
Guanajuato	Mex	3,000,000	540,000	5	74,250	Oct. 1906	.07½
Guggenheim Expl.	Mex	17,000,000	105,000	100	3,172,500	Apr. 1907	2.50
Kerr Lake, s.	Ont.	3,000,000	600,000	5	210,000	Oct. 1906	.10
LeRoi No. 2, g.	B. C.	3,000,000	120,000	25	716,400	Feb. 1907	.24
McKinley-Darragh,s.	Ont.	2,500,000	2,000,000	1	100,000	Mar. 1907	.02
Mexican Coal & Coke	Mex	5,000,000	50,000	100	600,000	Dec. 1905	3.00
Mex. Con. M. & S. Co.	Mex	2,500,000	240,000	10	360,000	Feb. 1907	.50
Mines Co. of Am.	Mex	2,000,000	2,000,000	1	2,585,000	Apr. 1907	.02
N. Y. & Hond. Ros.	C. A.	1,500,000	150,000	10	2,257,000	Feb. 1907	.20
Nipissing, s.	Ont.	6,000,000	1,200,000	5	960,000	Apr. 1907	.15
North Star.	B. C.	1,500,000	1,300,000	1	351,000	Dec. 1904	1.00
N. S. St. & Coal, com.	N. S.	5,000,000	49,703	100	788,600	Nov. 1904	2.00
N. S. St. & Coal, pf.	N. S.	1,030,000	10,300	100	375,950	Apr. 1907	1.50
Penoles*.	Mex	250,000	2,500	100	8,213,375	Mar. 1907	20.00
Platanillo.	Mex	500,000	206,989	1	5,580	Sept. 1906	.00½
Reco, g. s.l	B. C.	1,000,000	958,000	1	327,082	Apr. 1906	.02
Silver Queen, s.	Ont.	1,500,000	1,500,000	1	120,000	Jan. 1907	.08
Slocan Star.	B. C.	500,000	500,000	1	575,000	Dec. 1904	.05
St. Eugene Con.	B. C.	3,500,000	3,202,000	1	402,120	Oct. 1905	.02
Tezuitlan Copper	Mex	1,000,000	10,000	100	.....	Apr. 1907	2.00
Tilt Cove, c.	N. F.	1,000,000	89,000	2	21,360	Jan. 1905	.48
Tretheway, s.	Ont.	1,000,000	1,000,000	1	80,000	Mar. 1907	.04
Tyee, c.	B. C.	940,000	180,000	5	136,800	Dec. 1904	.24

*Mexican Currency.

THE MINING INDEX.

The editors of this paper read all the important publications of the world that relate to mining and the treatment of minerals. This index is published as a reference for all interested and to make it impossible for readers of the ENGINEERING AND MINING JOURNAL to miss any important article published anywhere.

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ALUMINUM

3124—ALLOYS—Disintegration of Aluminum Alloys. E. S. Sperry. (Brass Wld., Mar., 1907; 1½ pp.) Relates some instances of disintegration of aluminum and nickel alloys which came under the observation of the author. 20c.

3125—ALLOYS—Light Aluminum Alloys. J. E. S. Jones. (I. and C. Tr. Rev., Apr. 12, 1907; 1 p.) Abstract of paper read before the Coventry Eng. Soc., describing the properties of various alloys of aluminum and other metals, and giving notes on the present practice of casting them. 40c.

3126—ELECTROLYSIS—Ueber Elektrolytische Gleichrichtung von Wechselstrom. J. Sebor and L. Simek. (Zeit. f. Elektrochem., Mar. 29, 1907; 2½ pp.) Gives briefly the results of investigating the effects of foreign metals upon the properties of aluminum, also the electric relations of aluminum cells. 40c.

ANTIMONY

3127—METALLURGY—Sur la métallurgie de l'Antimoine. G. Pautrat. (Rev. de Chimie Industrielle, Mar., 1907; 5 pp.) A study of the methods used in smelting and refining antimony ore, as carried on in a plant at Mayenne, France, describing furnace construction, the charges used, the course of the smelting operation and the products obtained. 40c.

ASBESTOS

3128—ASBESTOS DISCOVERIES in Foreign Countries. F. Cirkel. (Can. Min. Journ., Apr. 1, 1907; ½ p.) Gives some brief notes on the recent discovery of asbestos in the Ural region of Russia, and describes briefly the present condition of mining. 20c.

BARYTES

3129—BARYTES INDUSTRY of the South. E. K. Judd. (Eng. and Min. Journ., Apr. 20, 1907; 2 pp.) An account of the present state of the barytes industry in Tennessee, describing the methods of mining, cleaning, roasting and grinding barytes. 20c.

BROMINE AND IODINE

3130—PRODUCTION OF BROMINE—Ueber die elektrolytische Gewinnung von Brom und Jod. Max Schlötter. (Halle, A. S., Germany, 1907; Wilhelm Knapp; 50 pp.) Monograph describing in considerable detail the various practical electrolytic methods of producing and purifying bromine and iodine, with notes on the sources of the raw material and some discussion of the properties, uses and methods of analysis of these two substances. 80c.

CEMENT

3131—PORTLAND CEMENT—Aus Pommerns Ziegel-, Zement, und Kalkindustrie. H. Hirsch. (Tonindustrie Zeit., Mar. 19, 1907; 4 pp. Continuation of article previously indexed, describing the works and appliances of the cement works at Stolp. 20c.

COAL AND COKE

3132—ACCOUNTING—A System of Coal-mine Accounting. F. A. Hill. (Eng. and Min. Journ., Mar. 30, 1906; 1½ pp.) Describes a system of mine accounting in actual use, with examples of pay-rolls and time-sheets, and notes on the proper method of keeping them. 20c.

3133—BOBBINITE—Report of the Departmental Committee on Bobbinite. (Coll. Guard., Apr. 12, 1907; 4 pp.) Deals with the characteristic features of this explosive, and tabulates the results of tests in which it was compared with several other explosives. 40c.

3134—CANADA—The Coals and Coal Fields of Alberta, Saskatchewan and Manitoba. D. B. Dowling. (Can. Min. Journ., Apr. 15, 1907; 2½ pp.) Reviews the extent and character of the coal found in these three Prairie Provinces. 20c.

3135—CANADA—Notes on the Mineral Fuel Supply of Canada. R. W. Ells. (Trans. Royal Soc. of Canada, Vol. XII, Section IV, Second series, 1906-1907; 22 pp.) Describes various known occurrences of lignite, coal and petroleum in Canada, which may become available for fuel supply in the future, but which at present are not exploited.

3136—CERTIFIED MINE POSITIONS. H. H. Stoek. (Mines and Min., Apr., 1907; 2 pp.) Paper read before Coal Mining Inst., Dec., 1906, discussing the character of examinations of competency as required in several States. 20c.

3137—COAL CONSUMPTION—Efficiency in Coal Consumption. Myles Brown. (Sci. and Art of Min., Mar. 23, 1907; 1 p.) Continuation of article previously indexed, dealing in this instalment with the losses in the form of potential energy in the flue gases. 20c.

3138—COAL DUST PROBLEM. J. Ashworth. (Engineer, Lond., Mar. 15, 1907; 1 p.) Comments at length upon the unsatisfactory state of present knowledge regarding the relations of coal dust to explosions, and the efficiency of watering as a means of preventing them. 40c.

3139—COAL MINING—Heading by Longwall Machines. Sam Mavor. (Trans. Min. Inst. of Scotland, Vol. XXIX, Part 3, 1907; 11 pp.) Describes the relative advantages of channeling, chain-breast and longwall bar machines for driving advance workings, with a discussion of their advantages and limitations.

3140—COAL MINING—Mining Anthracite by Longwall. (Mines and Min., Apr., 1907; 2 pp.) Describes how this method of coal mining was applied in a mine where working conditions were rendered difficult by previous operations above and below. 20c.

3141—COAL MINING—The Technics of Coal Mining. G. H. Winstanley. (Min. Engineering, Apr., 1907; 3 pp.) Continuation of a series of articles previously indexed, dealing in the present instalment with machines and mechanical powers. 20c.

3142—COKE—The Connellsville Coke Supply. L. W. Fogg. (Iron Age, Mar. 28, 1907; 1 p.) Reviews industrial conditions in this coke field, with a few figures showing the growth of the Lower Connellsville output. 20c.

3143—COKING Freeport Coals in Preston County, West Virginia. J. B. Hanford. (Mines and Min., Apr., 1907; 2 pp.) Paper read before Coal Mining Institute, Dec. 19, 1906, outlining the development of the process for manufacturing these West Virginia coals into high-grade coke. 20c.

3144—COLORADO—The Yampa Coal Field, Routt County, Colorado. N. M. Fenneman and H. S. Gale. With a chapter on the Character and Use of the Yampa Coals, by M. R. Campbell. (Bull. 297, U. S. Geol. Surv., 1906; 96 pp.) Monograph describing the geological features of this Colorado coal field.

3145—ELECTRIC POWER—Central Electric Drive for Collieries. F. E. Junge. (Eng. and Min. Journ., Apr. 13, 1907; 3 pp.) A comparison of the advantages of a central electric drive for collieries whether operated by steam or gas engines, as against direct drive for the prime movers. 20c.

3146—ELECTRIC WINDING PLANT at a German Colliery. Alfred Gradenwitz. (Eng. and Min. Journ., Apr. 13, 1907; 3½ pp.) Details the features of the equipment of the Vereinigte Marie Luise mine at Neindorf. 20c.

3147—GAS PRODUCERS—The Manufacture of Producer Gas with Special Reference to Western Coals. R. S. Moss. (Black Diamond, Apr. 6, 1907; ½ p.) Gives a few reasons why Western coals have not been considered suitable for use in gas producers, and describes methods whereby they can be utilized with efficiency. 20c.

3148—GAS PRODUCERS—The Utilization of Low Grade Fuel in Gas Producers. F. E. Junge. (Iron Tr. Rev., Apr. 4, 1907; 3 pp.) A consideration of economic features of fuel utilization, with a discussion of the relative advantages of low-grade steam coal, lignite, peat and briquets as fuel for gas producers. 20c.

3149—INDIA—Note on the Makum Coal Field between the Tirap and Namdang Streams (Season 1905-6). R. R. Simpson. (Records, Geol. Surv. of India, Vol. XXXIX, Part 4, 1906, 13½ pp.) Describes the geological and physical features of this district.

3150—INDIA—The Jaipur and Nazira Coal Fields, Upper Assam. R. R. Simpson. (Records, Geol. Surv. of India, Vol. XXXIV, Part 4, 1906; 40 pp.) Enumerates the principal outcrops of coal in the several producing fields of this country, and gives brief notes upon the quality of coal and the workable areas.

3151—LABOR—Hours of Labor in Coal Mines. Departmental Report on the Eight Hours Day. (Coll. Guard., Apr. 12, 1907; 1 p.) Contains the report of the British Departmental Committee, rehearsing the evidence taken by it in regard to the eight-hour day, and giving statistics of labor conditions which exist at present in the mines. 40c.

3152—MINE EXPLOSIONS in Illinois. R. Newsam. (Mines and Min., Apr., 1907; 2 pp.) Shows the results of firing a tight shot when neither gas nor coal dust was present. 20c.

3153—MINE EXPLOSIONS—La Cause des Coups de Grisou simultanés de Reden, Liévin, Charlestown et Fayetteville. M. Mascart. (L'Echo des Mines, Apr. 4, 1907; ½ p.) Reviews the causes of simultaneous dust explosions in coal mines in different countries, and points out the influence of earthquake and falling barometer upon the appearance of gas in mines. 40c.

3154—MINE GASES—Chemical Composition of Gases. J. Robinson. (Min. Engineering, Apr., 1907; 3 pp.) Gives the properties and compositions of all the gases met with in mines, with methods for detecting their presence. 20c.

3155—MINE INSPECTION SERVICE of Pennsylvania. (Mines and Min., Apr., 1907; 5 pp.) Gives the history of the growth of the mine inspection service of Pennsylvania, and describes the present organization and the requirements of the law. 20c.

3156—OHIO—Coal Mining in Ohio During 1906. Geo. Harrison. (Eng. and Min. Journ., Apr. 20, 1907; ½ p.) Gives the advance figures from the Report of the Chief Mine Inspector of Ohio, showing developments in the field during 1906. 20c.

3157—OHIO—Methods of Working the Coal Seams of Ohio. F. W. Parsons. (Eng. and Min. Journ., Apr. 20, 1907; 5½ pp.) An account of mining operations and colliery equipment of several plants in this field, where the methods of working are modified by the presence of an overlying stratum of quicksand, which makes it impossible to rob pillars with subsequent caving. 20c.

3158—PENNSYLVANIA—Geology of the Buck Mountain Coal Bed. H. W. Althouse. (Eng. and Min. Journ., Apr. 6, 1907; 2 pp.) Gives some notes on the geological features of this Pennsylvania district where the different degrees of inclination of the coal make it necessary to employ all methods of anthracite mining in the St. Clair colliery. 20c.

3159—POWER PLANT of the Berwind-White Coal Company's No. 40 Mine. (Engineer, Apr. 1, 1907; 6 pp.) Describes some of the important labor-saving devices connected with the electrical plant of this Pennsylvania mine. 20c.

3160—PROPS—The Use of Steel Props and Girders in Mines. J. Ashworth. (Mines and Min., Apr., 1907; 1 p.) Compares the cost of steel mine props as against wooden girders and describes some installations of steel props in English coal mines. 20c.

3161—QUALITY OF COAL—Specific Gravity of Coal as a Measure of Purity. M. S. Hachita. (Eng. and Min. Journ., Apr. 6,

1907; 2 pp.) Describes the use of the Jolly balance for determining specific gravities, and discusses the correctness of using this factor as a criterion of quality. 20c.

3162—RESCUE APPARATUS—Breathing Apparatus for Rescue Work in Coal Mines. F. W. Gray. (Can. Min. Journ., Apr. 15, 1907; 2 pp.) Reviews the essential features of several types of portable rescue apparatus for use in coal mines. 20c.

3163—RESCUE APPARATUS—Nouveaux Appareils de Sauvetage dans les Mines. H. Schmerber. (Génie Civ., Apr. 6, 1907; 3 pp.) Continuation of article previously indexed, dealing in this instalment with various types of non-portable rescue apparatus, which require air-tubes connecting the rescuers with air pumps. 40c.

3164—RESCUE APPARATUS—Use and Care of Oxygen-breathing Apparatus. M. H. Habershon. (Coll. Guard, Apr. 12, 1907; 1 p.) Paper read before the Midland Inst. of Min., Civ. and Mechan. Engrs. giving notes on the experiences gained in the use of various types of rescue apparatus, means of testing them, and of drilling miners in their use. 40c.

3165—ROOF PRESSURES—The Effects of Roof Pressures in Longwall Workings. Henry Briggs. (Mines and Min., Apr., 1907; 2½ pp.) Shows how roof pressures may be taken advantage of in longwall mining, so that the coal may be brought down without blasting. 20c.

3166—SMOKELESS FUEL from Coal. J. Grossmann. (Min. Engineering, Apr., 1907; 2½ pp.) Reviews the conditions which will have to be fulfilled in order to produce economically a smokeless product standing between the original coal and coke. 20c.

3167—WEST VIRGINIA—Development of Freeport Coals in West Virginia. J. B. Hanford. (Indus. Wld., Apr. 13, 1907; 3 pp.) Considers the historical and geological development of the coals of this district, and describes the utilization of a Bradford breaker for eliminating bone and small pieces of binder. 20c.

3168—WYOMING—Coal in Wyoming. (Min. Rep., Mar. 21, 1907; 2½ pp.) A review of the present state of the coal mining industry compiled from various official sources. 20c.

COPPER

3169—Notice Géologique et Minière sur le Bassin Cuprifère du Koulou-Niari (Congo Francais). D. Leavit. (Ann. des Mines, T. XI, 1 livr. of 1907; 59 pp.) An account of a trip by the author along the old caravan routes across the French Congo, describing particularly the geological features and the ore deposits in the copper region of Koulou-Niari.

3170—CANADA—Eldorado Copper Mine. A. G. Burrows. (Can. Min. Journ., Apr. 15, 1907; 1 p.) Notes upon the equipment, buildings and the smelter of this copper mine situated in Hastings Co., Ontario. 20c.

3171—CONCENTRATION PRACTICE at Great Falls, Montana. C. W. Goodale. (Mines and Min., Apr., 1907; ½ p.) Gives brief notes on concentrating and smelting practice as carried on in the works of the Boston and Montana Cons. Copper Co. 20c.

3172—CONVERTER—A Modern Electric Converter. G. B. Shipley. (Min. Wld., Mar. 23, 1907; 1 p.) Gives features of the design of this converter, which is operated by electricity, and which has individual tuyeres and other unique points. 20c.

3173—COPPER SCRAP—The Recovery of Copper from Scrap. (Metal Industry, Apr., 1907; 1½ pp.) Describes a standard design of a scrap recovering furnace with details of its operation and management. 20c.

3174—COPPER SMELTING—The Chief Advances in Copper Smelting in Modern Times. W. Gowland. (Presidential Address before the Instn. of Mining and Metallurgy, and published in Bull. No. 31, Apr. 11, 1907; 26 pp.) Reviews briefly the art of copper smelting in ancient times and enumerates some of the principal improvements which have been made as regards refining, bessemerizing and furnace practice.

3175—DESULPHURIZING — The McMurtry-Rogers Process for Desulphurizing Copper Ores and Mattes. T. C. Cloud. (Paper read before the I. M. M., April 18, 1907; 11 pp.) Describes the chemistry of this process of desulphurizing copper ores and mattes, in which it is essential that the charge be wet, and contain from 15 to 35 per cent. silica, the basis of the operation being the blowing of air through a bath.

3176 — ELECTROLYSIS — Ueber Passives Kupfer, Bezw. das Anodische Verhalten des Kupfers in Natronlauge. E. Müller. (Zeit. f. Elektrochem., April 12, 1907; 8 pp.) Describes and discusses in considerable detail a series of 38 experiments on the electrolytic behavior of copper in various sodium solutions, with reference to polarization of the anode copper and resultant variations in electromotive force. 40c.

3177—ELECTROLYTIC COPPER—A Study in Refining and Overpoling Electrolytic Copper. H. O. Hofman, R. Hayden and H. B. Hallowell. (Bi-monthly Bull., A. I. M. E., March, 1907; 25 pp.) Studies the physical and chemical changes undergone during the process of refining copper, also a discussion of the phenomenon of overpoling.

3178—GEOLOGY — Some New Points in the Geology of Copper Ores. J. F. Kemp. (Min. and Sci. Press, March 30, 1907; 1½ pp.) Paper read at March meeting of Can. Min. Inst. Contains a few speculations as to the formation of orebodies by secondary enrichment through the agency of ascending waters. 20c.

3179—IDAHO—The White Knob Copper Deposits, Mackay, Idaho. J. F. Kemp and C. G. Gunther. (Paper read at New York meeting of A. I. M. E., April, 1907; 28 pp.) Gives notes on the geological relations of the mineralized area in this camp; also describes the rocks and the contact phenomena met with.

3180—LAKE SUPERIOR — Notes on the Copper Range. (Min. and Sci. Press, March 23, 1907; 1 p.) Gives brief notes on hoisting practice and handling of ore in the rock-house as carried out in this Lake Superior region. 20c.

3181—MEXICO—The Cananea Copper Deposits. R. B. Brinsmade. (Mines and Min., April, 1907; 2½ pp.) Gives an account of the early discoveries and work in this Mexican copper district, describes the extent and richness of the orebodies in the different mines and comments on the mining methods. 20c.

3182—MILL—The Garfield Mill of the Utah Copper Company. L. H. Beason. (Min. and Sci. Press, April 13, 1907; 1½ pp.) Describes briefly the power and concentrating equipment of this new copper mill, which went into commission in April, 1907. 20c.

3183 — PENN-WYOMING COPPER COMPANY. (Min. Journ., March 16, 1907; 1 p.) Gives the report of the engineer detailed to examine the mines of this company, which speaks of the economical conditions surrounding the property and of the prospects for good ore production. 40c.

3184—PYRITIC SMELTING — Fundicion piritica sin el auxilio de combustible carbonifero. I. D. Ossa. (Bol. de la Soc. Nac. de Mineria, Jan. 31, 1907; 22 pp.) Reviews the present state of pyritic smelting practice and discusses the thermal principles involved in this art.

3185—SMELTER—Enlargement of B. C. Copper Co.'s Smelter at Greenwood. (B. C. Min. Rec., Feb., 1907; 2 pp.) Outlines the progress made in enlarging the works of this copper company. 20c.

3186 — UTAH — Mining Developments in Bingham, Utah. A. L. Pearse. (Min. Journ., March 2, 1907; 1 p.) Describes the general conditions of the mining industry in this State from an English point of view. 20c.

DIAMONDS

3187—CARBON: A Remarkable Mineral. I. C. Yawger. (Min. Wld., March 30, 1907; 2 pp.) Gives an outline of the carbon industry, especially in regard to supplying diamonds for drilling purposes, with notes on methods of splitting, use in drills and costs of stones. 20c.

3188—SOUTH AFRICA—Paardeberg Mines and District. H. D. Griffiths. (South African Mines, March 23, 1907; 1 p.) Outlines the geological conditions and developments on the claims of this district. To be continued. 20c.

FLUORSPAR

3189—HYDROFLUORIC ACID—The Manufacture of Hydrofluoric Acid. Anson G. Betts. (Eng. and Min. Journ., April 20, 1907; 1 p.) Describes simple apparatus for making this acid in small or in commercial quantities, and gives the procedure for analyzing the commercial acid. 20c.

GOLD AND SILVER

3190—ALASKA—Water Supply of Nome Region, Seward Peninsula, Alaska. J. C. Hoyt and F. F. Henshaw. (U. S. Geol. Surv., W. S. and I. Paper No. 196; 52 pp.) Gives the results of the systematic measurement and study of the sources of water supply of this district, with regard to the possible development of placer operations.

3190a—BLACK SANDS—The Auriferous Black Sands of California. J. A. Edman. (Bull. No. 45, State Mining Bureau of California, Apr., 1907; 22 pp.) Discusses the industrial aspect of the gold-bearing black sand situation in this State, with brief notes on methods of treating these sands, and their approximate values. 20c.

3191—COBALT—Genesis of Ores of the Cobalt District. H. W. Hixon. (Eng. and Min. Journ., March 30, 1907; 1 p.) Contains a few remarks upon the possible genesis of these Canadian silver ores in refutation of the theory proposed by Prof. Van Hise. 20c.

3191a — COBALT — The Bonanza Silver Mines of Cobalt, Ontario. W. Spencer Hutchinson. (Eng. and Min. Journ., Apr. 27, 1907; 2½ pp.) Describes the condition of mining operations in this camp as seen by the author in April, 1907. 20c.

3192—COBALT—The Geology of the Cobalt District. C. R. Van Hise. (Paper read before the Can. Min. Inst., March, 1907; 1½ pp.) Outlines the geological features of this district, considers the probable source of the minerals, and gives the author's opinion that the depositions have been produced by double concentration. 20c.

3193—COLOMBIA—The Eocene Gold-bearing Gravels of Colombia. F. C. Nicholas. (Min. Wld., April 20, 1907; 1 p.) Gives the results of explorations of these South American gravels, with a few remarks upon their geological relations. 20c.

3194 — COLORADO — Old Hundred Mine and Mill. (Mines and Min., April, 1907; 5 pp.) Illustrates the possibilities of mining in San Juan Co., Colorado, by the use of aerial trams and describes the method of mining as carried out at the Old Hundred mine. 20c.

3194a—CYANIDATION — Electrolysis of Gold from Cyanide Solutions. D. Lay. (Eng. and Min. Journ., Apr. 27, 1907; 2½ pp.) Describes the construction and operation of electrolytic precipitation devices at the Reliance mill at Nelson, B. C., with detailed drawings of the precipitation tanks used. 20c.

3195 — CYANIDATION — Last Drainings. H. A. White. (Journ. Chem., Met. and Min. Soc. of South Africa, Feb., 1907; 5 pp.) Discusses the washing of tailings with a view to finding an advantageous ratio between time of treatment and increasing amounts of gold dissolved. 60c.

3195a—CYANIDATION—The Moore and Butters Filter. E. H. Nutter. (Min. and Sci. Press, Apr. 20, 1907; 1 p.) A reply to some of the criticisms made by Mr. Bosqui which tended to show the superiority of the Butters process over the Moore process. 20c.

3196—CYANIDATION—The Butters Filter. E. S. Pettis. (Min. and Sci. Press, March 23, 1907; 1 p.) Gives specific data on construction, capacity and operation of an installation of Butters filters in the Combination mill at Goldfield, Nev. 20c.

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3198 — CYANIDE PLANT for Treating Guanajuato Ores. C. W. Van Law. (Eng. and Min. Journ., April 6, 1907; 3 pp.) Descriptions of the mill, cyanide plant and methods of agitating and treatment as carried out by the Guanajuato Reduction and Mines Co. 20c.

3199—CYANIDE PRACTICE at the Reliance Mill. D. Lay. (Eng. and Min. Journ., April 20, 1907; 2 pp.) Outlines the working of the Hendryx cyanide process, also the procedure in agitating, settling and decanting, with statements of rates of filtration and extraction obtained. 20c.

3200—CYANIDE SOLUTIONS—The Assay of Cyanide Solutions. (West. Chem. and Met., April, 1907; 1½ pp.) Discussion by J. L. Martel of paper on the above subject by C. H. Jay and others, giving the procedure for a new method of testing cyanide solutions, whereby the gold is collected in spongy lead. 60c.

3201—DREDGING—The Fraser as a Dredging Field. H. G. Stringer. (Min. Journ., March 16, 1907; 1 p.) Describes general placer-mining conditions in this British Columbia field and comments briefly upon the future prospects of the district. 40c.

3202—ELECTRIC POWER—The Economy of Electric Power in Quartz Mining. C. O. Poole. (Journ. Elec., Power and Gas, April 13, 1907; 5 pp.) Compares the relative efficiencies of wood, coal, oil and electricity as a source of motive power for mines on the Mother Lode of California. 20c.

3203 — FAULTING — The Extraordinary Faulting at the Berlin Mine. Ellsworth Daggett. (Eng. and Min. Journ., Mar. 30, 1907; 5 pp.) Paper presented at the April, 1907, meeting of the A. I. M. E. Sums up the principal features of the remarkable faulting movements which have taken place in this Nevada mine. 20c.

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3206—GOLD DREDGING—Some Particulars of New Zealand Dredging Operations. C. C. Longridge. (Min. Journ., March 23, 1907; ½ p.) Compilation from the New Zealand Mining Handbook, 1906. Tabulates the essential features as regards capacity, costs and time of operation of the principal dredging companies operating in New Zealand. 40c.

3207 — GOLD DREDGING MACHINERY, Recent Applications of. F. C. Nicholas. (Min. Wld., March 23, 1907; 1½ pp.) Describes the design of a special dredge recently built to be used in saving placer gold and diamonds in Brazil. The material containing the diamonds is delivered to the shore by a centrifugal pump in order to obtain a firm foundation for the concentrating apparatus. 20c.

3208—GOLD EXTRACTION—Notes on the Occurrence and Treatment of an Auriferous Ore Containing Insoluble Arsenides. J. K. Wilson. (Journ. Chem., Met. and Min. Soc. of South Africa, Feb., 1907; 4 pp.) Sums up the results of many experiments to determine an efficient method of working up gold ores containing insoluble arsenides. 60c.

3209—GOLD MILLING—Milling of Gold Ores. (L. A. Min. Rev., March 23, 30, and April 6, 1907; 3 pp.) Continuation of article previously indexed, dealing with the evolution of he stamp mill and milling practice of the West. 60c.

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3214—MEXICO—The Parral District, Mex. F. Lynwood Garrison. (Min. and Sci. Press, March 23, 1907; 2 pp.) Describes present mining conditions in this famous silver-mining district, Chihuahua, where American capital and energy are responsible for renewed activity. 20c.

3215—MINE AIR — Witwatersrand Mine Air; Recent Investigations. James Moir. (Journ. Chem., Met. and Min. Soc. of South Africa, Feb., 1907; 16 pp.) Author's reply to the discussion on his paper of the above title, which was previously mentioned in the Index. 60c.

3216—NEVADA—Mining in the Wonder District, Nevada. Edward R. Zalinski. (Eng. and Min. Journ., April 20, 1907; 2 pp.) Reviews the present state of the mining industry in this Nevada district, describing a few of the principal claims. 20c.

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3220a—SIBERIA—A Brief Sketch of the Lena District, Siberia. C. W. Purington. (Min. Journ., Apr. 20, 1907; 1 p.) Gives a few general notes describing the conditions of placer mining along the basin of the Lena river, with statements of gold production. 40c.

3221—TUBE MILLS—The Computation of the Crushing Efficiency of Tube Mills. S. H. Pearce and W. A. Caldecott. (Journ. Chem., Met. and Min. Soc. of South Africa, Feb., 1907; 3 pp.) Discussion by Prof. R. H. Richards of the above paper, which was previously mentioned in the Index. 60c.

3222—YUKON—Mining in the Yukon. A. Thompson. (Can. Min. Journ., April 1, 1907; ½ p.) Contains a few notes on the present state of gold dredging in the Yukon. 20c.

3223 — ZINC PRECIPITATES — The Production of Bullion from Zinc Box Precipitates. E. H. Taylor. (Monthly Journ. Chamber of Mines of W. A., Feb. 28, 1907; 1 p.) A few brief statements upon melting zinc-box sludge and producing the bullion from it. 80c.

GRAPHITE

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IRON AND STEEL

3226 — BLAST FURNACE CHARGING—Ueber Hochofen-Begichtung. E. Münker. (Stahl u. Eisen, April 10, 1907; 2 pp.) Shows the construction and working of a device for charging blast furnaces where a central tube for the ore and fluxes is run down in the center of the bell, whose action it supplements. Accurate distribution of the charge exactly as desired is claimed for the apparatus. 40c.

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3229—BLAST FURNACE PRACTICE—The Luermann Cinder Notch. F. W. Luermann. (Iron Age, April 18, 1907; 1 p.) Comments upon some of the disturbances which take place in blast furnaces with regard to the flow of slag, and describes the operation of this cinder notch, which places the slag outlet lower than the tuyeres and makes it possible to prevent the slag running into the tuyeres and blast pipes when the pressure drops or the blowing engines stop. 20c.

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3237 — IRON-CARBON ALLOYS — Ueber den augenblicklichen Stand unserer Kenntnisse der Erstarrungs- und Erkaltungsvorgänge bei Eisenkohlenstofflegierungen. P. Goerens. (Metallurgie, March 22, 1907; 12½ pp.) Continuation of article previously indexed, this instalment dealing with the influence of heat treatment on the structure of iron-carbon alloys. 40c.

3238—IRON MINING—The Ironstone of Cleveland. A. E. Pratt. (Paper read before the Instn. of Min. and Met., April 18, 1907; 9 pp.) A few notes on the methods of mining and calcining these ores, with some practical suggestions on the working of the Cleveland kiln.

3239—IRON ORE IN GERMANY—La pénurie du mineral de fer en Allemagne. (L'Industrie, March 31, 1907; 1 p.) Discusses the economic features of the scarcity of iron ore in Germany and analyzes the consumption of ore and production of steel in this kingdom, and their relation to future prospects. 40c.

3240—IRON ORES—The Supplies and Reserves of Iron Ores. J. Birkinbine. (Paper read before the Can. Min. Inst., March, 1907; 4 pp.) Detailed summary of the reserves of iron ore in various countries of the world as estimated by the author, and calculations upon the probable consumption of the future and its relation to the reserve supplies. 20c.

3241—IRON ORES OF THE SALISBURY DISTRICT of Connecticut, New York and Massachusetts. W. H. Hobbs. (Econ. Geology, March-April, 1907; 28 pp.) Enumerates and briefly describes the principal producing mines in this district, with a few notes upon the origin of the ores, and a discussion of their composition, illustrated by numerous analyses. 60c.

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3243—MAGNETITE — Ueber magmatische Ausscheidungen von Eisenerz im Granit. J. H. L. Vogt. (Zeit. f. prak. Geol., March, 1907; 5 pp.) Describes briefly some deposits of magnetite in northern Norway, which the author considers to be formed by magmatic segregation from granite. 40c.

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ures and modes of ore occurrence in this Minnesota iron district, with a few remarks on explorations and prospecting which have been undertaken. 20c.

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3250—RAIL SPECIFICATIONS—Comparison of American and Foreign Rail Specifications, with a Proposed Standard Specification to Cover American Rails Rolled for Export. (Bi-monthly Bull., A. I. M. E., March, 1907; 7½ pp.) Reply by Albert Ladd Colby to the discussion of his paper of the above title, which was previously mentioned in the Index.

3251—ROLLING MILLS—A Feeding Device for Rolling Mills. (Iron Age, April 18, 1907; 1 p.) A description of a new device applicable to mills employed for rolling steel, one of its features being that it makes it possible to roll and edge material at the same time without changing the rolls. 20c.

3232—STEEL INGOTS—Piping and Segregation in Steel Ingots. H. M. Howe. (Paper read before the London, 1906, meeting of the A. I. M. E.; 106 pp.) Very detailed discussion of the causes of piping and segregation in steel ingots, with methods of prevention, and proposes certain precautions in engineering specifications concerning these defects.

3253—STEEL PRODUCTION—Compound Steel—A Modern Steel Plant Proposition. P. Eyermann. (Electrochem. and Met. Ind., April, 1907; 3 pp.) Describes the construction of a new steel plant proposed by the author, in which liquid pig iron is to be tapped directly into a compound steel furnace, and in which mixers and bessemer blower engines will be done away with. 40c.

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LEAD

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MANGANESE

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MOLYBDENITE

3259—MOLYBDENITE DEPOSITS in Australia. John Plummer. (Min. Wld., March 30, 1907; 1 p.) Describes briefly the occurrence of molybdenum ore in New South Wales and Queensland, with a few remarks upon the methods of mining. 20c.

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3265—ITALY—The Petroleum Fields of Italy. (Pet. Rev., Apr. 13, 1907; 1 p.) Outlines the petroleum situation in this country, and enumerates the principal producing countries. 40c.

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RARE METALS

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3271—THALLIUM—Contributions to the Chemistry of Thallium. L. F. Hawley. (Journ. Am. Chem. Soc., Mar., 1907; 4½ pp.) Gives the procedure for the volumetric determination of thallium, together with a description of the preparation and properties of thallium fulminate. 60c.

SALT

3272—SPAIN—Las Salinas de Torrevieja. (Revista Minera, Apr. 1 and 8, 1907; 9½ pp.) Gives an illustrated account of the Torrevieja salt works in the province of Alicante, Spain, where operations are conducted on a large scale. Methods of exploitation are described, and statistics of production are given. 60c.

SULPHUR

3273—SULPHUR—Note sur les Conditions Economiques de l'Exploitation du Soufre en Sicile et en Louisiane. L. Aguilion. (Ann. des Mines, T. X, 12 livr. of 1906; 19 pp.) Traces the growth and development of the Sicilian sulphur industry, and reviews the effect of the entrance of the Italian government into this business. Gives also some notes on the Frasch process of exploiting the Louisiana sulphur deposits. 60c.

TIN

3274—BOLIVIA—Tin-ore Deposits of Bolivia. G. Steinmann. (Min. Journ., Apr. 6, 1907.) Translated from Proceedings of the Deutschen geologischen Gesellschaft. Contains a few remarks on the genesis and the geological features of these South American tin fields. 40c.

3275—CORNWALL—Experience with a Cornwall Tin Mine. Edw. Walker. (Eng. and Min. Journ., Apr. 6, 1907; ½ p.) Reviews briefly the financial condition of the Bassett tin mine, with reasons for its past non-success and prospects for future improvement. 20c.

3276—ORE DRESSING—Cornish Methods of Crushing and Ore Dressing. Edw. Walker. (Eng. and Min. Journ., Apr. 13, 1907; 3½ pp.) Describes some of the characteristic methods and appliances used in Cornish tin mills, and compares them with modern methods as to efficiency and elimination of hand labor, which is now very scarce in this district. 20c.

3277—METALLURGY OF TIN. P. J. Thibault. (Aust. Min. Stand., Mar. 27, 1907; 1 p.) Continuation of article previously indexed, taking up in this instalment the matter of designing sluices for concentrating and mining cassiterite and the disposal of tailings. 40c.

3278—TASMANIA—Report on the Renison Bell Tin Field. W. H. Twelvetrees. (Govt. Geologist's Office, Launceston, Tasmania, Dec. 18, 1906; 11 pp.) Describes the geological features of this Tasmanian tin field and enumerates the principal producers in the district.

3279—TIN SMELTING at Banka. J. Koomans. (Min. Journ., Mar. 23 and 30, 1907: 1½ pp.) Translation from the *Jaarback van het Mijnwczen*, describing the smelting operations, with notes on the refining of the residual and slag tin, and the working of the liquation furnaces. 40c.

ZINC

3280—BLENDE ROASTING—The Valuation of Roasted Blende with Regard to Its Sulphur Content. V. Hassreidter. (Eng. and Min. Journ., Apr. 13, 1907; 1 p.) Abstract by A. J. Lotka from *Zeit. f. angew. Chem.*, 1906, p. 522. Tabulates the results of analyzing different blendes roasted at various plants, and discusses the significance of the figures obtained and the conclusions to be drawn from them in regard to the condition of the sulphur after roasting. 20c.

3281—MISSOURI—The Ore Deposits of the Joplin Region, Missouri. F. L. Clerc. (Paper read at New York meeting A. I. M. E., Apr., 1907; 23 pp.) Gives possible theories as to the method of formation of the Joplin ore deposits in the light of the information obtained by recent extended development.

3282—ROASTING for Magnetic Concentration of Zinc Ores. F. H. Trego. (Eng. and Min. Journ., Mar. 30, 1907; 3 pp.) Compares the efficiency of the ordinary cylindrical furnace and the new circular table roaster as regards economy of operation. 20c.

3283 — TENNESSEE — Zinc in Eastern Tennessee. W. C. Clark. (Mines and Min., Apr., 1907; 1 p.) Describes the location of the deposits, the nature of the ores, and the work that has been done in this region. 20c.

3284—ZINC ORE ANALYSIS—Report of the Sub-Committee on. G. C. Stone and W. G. Waring. (Journ. Am. Chem. Soc., Mar., 1907; 6½ pp.) Tabulates the results of analyses made by many different people upon a standardized sample of zinc ore, and discusses their wide variation. Proposes a modification of Waring's method as a means of overcoming the defects of the procedures now in use for zinc analysis. 60c.

ECONOMIC GEOLOGY—GENERAL

3285—BRITISH COLUMBIA—Explorations in British Columbia. H. F. Evans. (Min. Wld., Mar. 23, Apr. 13 and 20, 1907; 3 pp.) Comments upon the explorations and the facts observed by different explorers in this district. 60c.

3286—COLORADO—Topographic Development of Chalk Bluffs and Pawnee Buttes. J. Henderson. (Proc. Colo. Sci. Soc., Vol. VIII, pp. 247-256, Mar., 1907.) Monograph describing the topographical features of the South Platte valley and their relation to the economic deposits of coal, fire-clay, oil, etc., which underlie the valley.

3287—ECONOMIC GEOLOGY and Ore Deposits. F. C. Nicholas. (Min. Wld., Apr. 6, 1907; 1 p.) Points out the features which must be taken account of in determining the economic value of a mineral deposit. 20c.

3288—FAULTS—How Should Faults be Named and Classified? J. E. Spurr and H. L. Fairchild. (Econ. Geology, Mar.-Apr., 1907; 3 pp.) Refutes several of the statements made by Prof. Jaggar in his article on nomenclature of faults, which he attributed to the authors. 60c.

3289—IGNEOUS ROCKS—A Simple Classification of Igneous Rocks. Scott Turner.

(Min. and Sci. Press, Mar. 30, 1907; 2 pp.) Gives a simplified and condensed classification of eruptive rocks, based on Rosenbusch's classification. 20c.

3290—MEXICO—Heretical Vein Types in Sonora. F. J. H. Merrill. (Eng. and Min. Journ., Apr. 6, 1907; ½ p.) Brief notes on the occurrence of two abnormal types of metalliferous veins in this district. 20c.

3291—MEXICO—Peculiar Formations of the Mexican Arid Region. R. T. Hill. (Eng. and Min. Journ., Apr. 6, 1907; 4½ pp.) Discusses the characteristic geological formations of this desert region, where the absence of water has resulted in many curious products of wind erosion. 20c.

3292—MEXICO—The Mineralization of Mexico. F. J. H. Merrill. (Eng. and Min. Journ., Apr. 6, 1907; ½ p.) Gives brief notes on the distribution of mineral veins in this country, and the nature of the eruptive rocks and their influence upon the ore deposits. 20c.

3293—MISSOURI—Biennial Report of the State Geologist Transmitted by the Board of Managers of the Bureau of Geology and Mines to the Forty-fourth General Assembly. (Missouri Bureau of Geol. and Mines, 1907; 57 pp.) Contains a report of the work done by the Bureau of Geology during 1905 and 1906, with recommendation for increased efficiency in the Bureau, and a summary of mining developments which have taken place during this period.

3294—NEW MEXICO—Water Resources of the Rio Grande Valley in New Mexico and Their Development. W. T. Lee. (U. S. Geol. Surv., W. S. and I. Paper No. 188, 1907; 59 pp.) Gives the results of an investigation on the water supply of this Territory, with special reference to utilizing underground waters and to storing surface waters.

3295—NEW ZEALAND—The Geology of the Area Covered by the Alexandra Sheet, Central Otago Division, Including the Survey Districts of Leaning Rock, Tiger Hill and Poolburn. James Park. (N. Z. Geol. Surv., Bull. No. 2, new series, 1906; 52 pp.) Contains chapters on the physiography, general and economic geology of this region, together with a few notes on petrography as applied to the characteristic rocks.

3296—ORE DEPOSITION—Formation of Ore Bodies by Aqueous Solutions. E. A. Ritter. (Ores and Metals, Apr. 5, 1907; 1½ pp.) Gives a general discussion on various standard modes of ore deposition, illustrating them by examples of characteristic veins. 20c.

3297—ORE DEPOSITION—Some Relations of Paleogeography to Ore Deposition in the Mississippi Valley. H. Foster Bain. (Econ. Geology, Mar.-Apr., 1907; 16 pp.) Gives some of the conclusions of the author upon the formation of ore deposits in the Mississippi valley and—the Wisconsin zinc fields and the influences of sedimentation upon this formation. 60c.

3298—ORE DEPOSITION—The Relation of Ore Deposition to Physical Conditions. Waldemar Lindgren. (Econ. Geology, Mar.-Apr., 1907; 22 pp.) Classifies ore deposits according as they have been consolidated from a molten magma, deposited from aqueo-igneous solutions or from aqueous hot solutions, and discusses each class in detail. 60c.

3299—ORE DEPOSITS at Shallow Depths. (Min. Wld., Apr. 20, 1907; ½ p.) Abstract of paper read before the Internat'l Geol. Congress, Mexican meeting. Some notes on metasomatic replacement agencies as means of developing ore deposits. 20c.

3300—ORE DEPOSITS of the Southwest. T. B. Comstock. (L. A. Min. Rev., Mar. 30, Apr. 6 and 13, 1907; 3½ pp.) Mentions some of the geological causes which are responsible for the genesis of the gold, silver and other ores in this district. To be continued. 60c.

3301—ROCK JOINTS—The Joint System in the Rocks of Southwestern Wisconsin and Its Relation to the Drainage Network. E. C. Harder. (Univ. of Wis., Bull. No. 138, July, 1906; 36 pp.) Contains a study of joints and joint directions in three main areas in southwestern Wisconsin, and describes the influence which they have upon the drainage of this region. 40c.

PRECIOUS STONES

3302—SAPPHIRES in Idaho. R. N. Bell. (Min. Wld., Apr. 6, 1907.) Describes briefly the geological and mineral formations in which the sapphires of Washington Co. have been found. 20c.

MINING—GENERAL

3303—BLASTING—Position and Direction of Holes for Blasting. D. H. Stovall. (Ores and Metals, Apr. 5, 1907; 1 p.) Shows how the location of drill holes is more important in breaking ground than the number, and how the arrangement of holes must be determined by the character of the ground to be broken, as shown by preliminary shots. 20c.

3304—CHILE—The Mining Industry in Chile. H. C. Ede. (Min. Journ., Mar. 23, 1907; ½ p.) A review of the present condition of mining in Chile, with special reference to copper and silver. 40c.

3305—CORNWALL—The Mining School at Camborne, Cornwall. Edw. Walker. (Eng. and Min. Journ., Mar. 30, 1907; 1 p.) Outlines the organization of this famous mining school of Cornwall. 20c.

3306—DRAINING Adjoining Mines by Means of Diamond Drill Holes. James Humes. (Eng. and Min. Journ., Apr. 6, 1907; ½ p.) Gives some notes on the use of the diamond drill as a means of tapping and unwatering flooded mines. 20c.

3307—EXPLOSIVE—How the Miner's Dynamite is Made. W. Symmes. (Min. and Sci. Press. Mar. 23 and Apr. 6, 1907; 6½ pp.) Continuation of article previously indexed, giving an interesting account of the theory of dynamite manufacture, and a description of the operations as carried on at several California mines. 40c.

3308—EXPLOSIVE—On Making Nitro-Glycerine. T. Withers. (Ores and Metals, Apr. 5, 1907; ½ p.) Describes the process which the author has often used for making his own nitro-glycerine and gives notes upon its safe use. 20c.

3309—FILING SYSTEM for Mining Engineers. W. S. Brown. (Min. and Sci. Press, Apr. 13, 1907; 1½ pp.) Describes a method of cataloging and filing references to articles of interest to a mining engineer, with illustrations of different types of cards suitable for this purpose. 20c.

3310—HALUAGE—Traction Engine Haulage in Idaho. Robt. N. Bell. (Eng. and Min. Journ., Apr. 20, 1907; 1 p.) Brief notes upon the cost of operation and the equipment of a traction engine outfit for hauling lead ore to the railroad. 20c.

3311—LABOR—Cost of Labor on the Rand. E. P. Rathbone. (Min. and Sci. Press, Apr. 13, 1907; 1 p.) Gives figures on wages paid to skilled and unskilled labor in this goldfield. 20c.

3312—LABOR—Cutting Down Cost of Ore Production by Providing More and Better Labor. Editorial. (Ores and Metals, Apr. 20, 1907; 1½ pp.) Comments upon a few means whereby fewer skilled workers may replace an abundance of unskilled workers with resultant lowering of cost. 20c.

3312a—LABOR—Mining Labor in Australia. W. J. Loring. (Min. and Sci. Press, Apr. 20, 1907; 1 p.) Describes the labor situation in this country, and shows how the payment of a higher rates of wages in certain camps has resulted in a great increase in efficiency. 20c.

3313—MEXICO—Old Mexican Workings and Some Remarks on Sampling. T. A. Rickard. (Min. and Sci. Press, Apr. 6, 1907; 3 pp.) Describes some of the workings of mines in Guanajuato, and outlines various methods of sampling as practiced in this district, with comments on their efficiency. 20c.

3313a—MINE ADMINISTRATION—Requirements of Modern Mining. J. R. Finlay. (Min. and Sci. Press, Apr. 20, 1907; 1½ pp.) Gives a few general remarks on the essential qualities for success in operating and managing mines. 20c.

3314—MINE EXPLOSIONS and Atmospheric Pressure. Geo. E. Collins, J. M. Gray and L. M. Evans. (Eng. and Min. Journ., Apr. 13 and 20, 1907; 1 p.) Continuation of the discussion of the relation of drop in atmospheric pressure to the emission of gases from both coal and metalliferous mines. 20c.

3315—MINE EXPLOSIONS—Guarding Against Accident. A. H. Martin. (Ore and Metals, Apr. 5, 1907; ½ p.) Brief notes on the causes of premature explosions and measures for their prevention. 20c.

3316—MINE GASES—The Cause and Prevention of the Ill Effects Due to the Inhalation of Noxious Fumes by Miners. E. A. Mann. (N. Z. Mines Rec., Feb. 16, 1907; 3 pp.) Few notes on the nature of carbon dioxide and noxious fumes, and characteristic systems of poisoning due to them. 40c.

3317—MINE TIMBERING. Claude T. Rice. (Eng. and Min. Journ., Apr. 6, 1907; ½ p.) Contains some speculations upon the nature of stresses in the earth which cause caves in mines. 20c.

3318—MINE TIMBERING—Method of Timbering Double-Compartment Shaft. D. H. Stovall. (Ore and Metals, Apr. 20, 1907; 1 p.) Shows how it is better to start a large shaft at a mine if the permanence of the vein is assured, and describes a method of timbering applicable to a two-compartment shaft. 20c.

3319—MINING LAW—Some Problems in Mining Law. (Min. and Sci. Press, Apr. 13, 1907; 1 p.) Gives the answers to some queries as to the status of development work done upon claims where it is necessary to trespass upon others in order to get at the one in question. 20c.

3320—MISSOURI—Obervations on Mining Developments in Missouri. E. R. Buckley. (Lead and Zinc News, Apr. 8, 1907; 3½ pp.) A few notes on the scope of mining developments in this field during 1906. 20c.

3321—NEW ZEALAND—The Mineral Resources of New Zealand. James Williams. (N. Z. Mines Rec., Feb. 16, 1907; 37 pp.) Considers the present development of mining in this country in regard to lodes, stratified deposits and alluvial drifts. 60c.

3322—NORTH CAROLINA—The Mining Industry in North Carolina during 1905. Joseph Hyde Pratt. (N. C. Geol. and Econ. Surv., Economic Paper No. 11, 1907; 96 pp.) Reviews the progress of the mining industry in this State during 1905, with statistics of production of the most important minerals and metals, and gives a summary of the mining laws and acts relating to mining.

3323—QUEBEC—Mining Possibilities in the Province of Quebec. Fritz Cirkel. (Paper read before Can. Min. Inst., Mar., 1907; 2 pp.) Considers the opportunities for increased mining activity in this province, with especial reference to the concentration of low-grade iron ores, and the utilization of high phosphorous ores from the Old Beds. 20c.

3324—QUEENSLAND MINING INDUSTRY—Review of the Year 1906. Report by the Under Secretary for Mines. (Queens. Gov. Min. Journ., Mar., 1907; 19 pp.) General summing of the progress and present status of the mineral industry of Queensland during 1906. 60c.

3325—SHAFT SINKING with the Aid of Pumps through Heavily-watered Strata. S. Dean. (Min. Engineering, Apr., 1907; 1 p.) Continuation of article previously mentioned in the Index. 20c.

3326—SURVEYING—Manual of Topographic Methods. Henry Gannett. (U. S. Geol. Surv., Bull. No. 307; 88 pp.) Describes the principal types of apparatus and the methods in use for making topographical surveys as now practiced by the Geological Survey.

ORE DRESSING

3227—CONCENTRATING TABLE—Ueber den "Tafelstoffherd" (System Gröppel. C. Blömeke. (Metallurgie, Apr. 8, 1907; 3 pp.) Describes the construction and operation of the Gröppel percussion table which differs from the Wilfley type in being slung from supports upon the principle of a hammock. Tests of its workings which show good results are included in the article. 40c.

3227a—FLOTATION PROCESS—The Elmore Vacuum Flotation Process. Edward Walker. (Eng. and Min. Journ., Apr. 27, 1907; 1 p.) Describes the claims of this new process of concentration which combines the principles of flotation with the added efficiency obtained by operating under a vacuum. 20c.

3328—ORE DRESSING—Primitive Mexican Crushing and Dressing Plant. F. H. Probert. (Eng. and Min. Journ., Apr. 6, 1907; 2 pp.) Describes and illustrates some of the simple and inexpensive appliances and methods of mining which are still in use in the mountains of Chihuahua. 20c.

3328a—TAILING ESTIMATION—Detection of Willemite by Phosphorescence. E. K. Judd. (Eng. and Min. Journ., Apr. 27, 1907; ½ p.) Describes the application of ultra-violet light to determine the presence of willemite in jog tailing in the mills at Franklin Furnace, N. J. 20c.

METALLURGY—GENERAL

3329—CHEMICAL INDUSTRY in British Columbia. W. R. Lang. (Journ. Soc. Chem. Ind., Mar. 30, 1907; 2 pp.) Describes the present state of development of the coke industry with the statistics of the by-products, and contains notes on the treatment of zinc ores and copper reduction. 80c.

3330—LEAD AND COPPER SMELTING, New Process of. (Lead and Zinc News, Apr. 8, 1907; 1 p.) Describes a new process invented by A. Lotti, the object of which is to provide means whereby ores containing the sulphides of lead and copper can be sulphurized to a considerable extent by the aid of waste heat of the smelting process, and at the same time the desulphurized product can be agglomerated into a form eminently

well adapted to subsequent reduction in a blast furnace. 20c.

3331—PROPERTIES OF METALS—Die neuren Anschauungen über die Ursachen der besonderen Eigenschaften der Metalle. R. Schenck. (Metallurgie, Mar. 22, 1907; 12 pp.) Sums up modern views of the properties of metals, which may be used to distinguish one from another, dealing especially with electrical properties. 40c.

3332—SMELTER SMOKE—Feeding Experiments with Forage Grown in the Smelter Zone. L. A. Merrill. (West Chem. and Met., Apr., 1907; 7 pp.) Sums up the results secured by a set of tests made to determine the actual amount of damage done by smelter fumes to vegetation, and points out easy methods of overcoming the poisonous effects of the gases. 60c.

3333—SMELTING WORKS—The Location of Reduction Works. L. S. Austin. (Eng. and Min. Journ., Apr. 13, 1907; 1 p.) Reviews some of the relative advantages of flat and sloping sites for metallurgical plants. 20c.

3334—TAILINGS—Storage of Tailings for Future Handling. H. T. Durant. (Eng. and Min. Journ., Apr. 13, 1907; ½ p.) Points out how proper classification of tailings would result in the saving of valuable ore which under present practices is lost in the tailings dump. 20c.

MINING AND METALLURGICAL MACHINERY

3335—AERIAL ROPEWAYS and Cableways. J. W. White. (Eng. Times, Apr. 4, 1907; 1 p.) Abstract of paper read before the Liverpool Eng. Soc., dealing with the economical transport of material by aerial wire ropeways and describing an installation recently designed for the Langlaagte Estate and Gold Mining Company, in South Africa, to carry 100 tons of gold per hour, one way, and 12 tons of coal per hour, back again. 20c.

3336—AERIAL TRAMWAY—Transporteur Aériens de 35 Kilomètres entre Chilecito et Upulungos (République Argentine). (Génie Civil, Mar. 23, 1907; 4 pp.) Describes the construction of an aerial tramway in Argentine, S. A., remarkable for the high altitude it reaches, and also because it is designed to carry people, water and other supplies, as well as ore. 40c.

3337—AIR COMPRESSION—Some Features of Air Compression. C. A. Dawley. (Sibley Journ. of Eng., Mar., 1907; 5½ pp.) Considers some of the principles of operating air compressors which must be kept in mind in order to secure maximum efficiency. 40c.

3338—AIR COMPRESSORS—Some Important Elements of Economy in the Straight Line and Duplex Types of Compound Air Compressors. L. I. Wightman. (Compressed Air, Mar., 1907; 6 pp.) Describes the development and modifications in the design of these two types of air compressors, and the economies which have resulted from them. 20c.

3339—BOILERS—The Lap Joint in Boilers. H. S. Brown. (Iron Age, Apr. 18, 1907; 2 pp.) Considers various causes of failures of lap joint boilers, with illustrations of defective riveting and incorrectly rolled plates, which result in weaknesses in the shell. 20c.

3340—BORING APPARATUS—Hydraulic-ram Boring Apparatus. W. Wolski. (Eng. and Min. Journ., Apr. 20, 1907; 1½ pp.) Describes the construction and method of operating this deep-boring apparatus, which utilizes the principle of the hydraulic ram to deliver a blow to the cutting edges. 20c.

3341—CONVERTERS—Method of Lining Converters. H. L. Charles. (Min. Wld., Apr. 13, 1907; 1 p.) Describes a new system of lining converters intended to provide an improved method of drying and hardening the basic or the silicious lining. 20c.

3342—CRANES—Modern Electrically-Driven Cranes. (Elec. Rev., Lond., Apr. 5, 1907; 2½ pp.) Gives description of some interesting installations of large electrically driven cranes. 40c.

3343—CRUCIBLES—Their Care and Use. John A. Walker. (Indus. Wld., Apr. 6, 1907; 5 pp.) Contains some very complete notes on the proper methods of caring for graphite crucibles and discusses the causes which result in their quick destruction. 20c.

3343a—DRILLS—Compressed Air and Machine Drill Economies. (So. African Mines, Mar. 30, 1907; 1 p.) Deals in a general way with the aspects of air compression and transmission on the Rand, and points out some of the ways in which present practice may be improved. 20c.

3344—DRILLS—Hydraulic Rock-Drills for the Rand. H. L. Leopold. (South African Mines, Mar. 16, 1907; ½ p.) Points out some advantages in using hydraulic rock drills on account of the fact that they lay dust in the headings. 20c.

3345—ELECTRIC FURNACES—New and Unique Electric Furnaces without Electrodes. F. C. Perkins. (Min. Rep., Mar. 28, 1907; 1½ pp.) Gives details of construction and operation of the Hiorth and Gin types of electric furnaces. 20c.

3346—ELECTRIC POWER INSTALLATION at Grangesberg Iron Mines, Sweden. G. Ralph. (Elec. Rev., Apr. 13, 1907; 2½ pp.) Condensed from a paper read before Newcastle Section of the Brit. Instn. of Elec. Engrs. Shows the construction and operation of the electric winding plant at this mine, describes its power consumption and efficiency and gives notes on the other electric devices used on the property. 20c.

3347—FAN—Tests of a Mine Fan. J. B. Thomson. (Trans. Min. Inst. of Scotland, Vol. XXIX, Part 3, 1907; 7 pp.) Discussion by members of the Institute of the above paper, which was previously mentioned in the Index.

3348—GAS ENGINES—Electric Starting Motor Equipment for Large Gas Engines. F. E. Junge. (Power, May, 1907; ½ p.) Describes the operation of a starting motor for large gas engines which supersedes the ordinary method of taking compressed air from reservoirs. 20c.

3349—HAULAGE—The Electric Locomotive in Mine Operation. F. C. Perkins. (S. L. Min. Rev., Apr. 15, 1907; 1 p.) Compares the relative advantages of compressed air and electric locomotives for mine haulage, and discusses briefly the conditions under which each is the more efficient. 20c.

3350—HYDRO-ELECTRIC PLANT for British Slate Quarries. (Elec. Wld., Apr. 13, 1907; 3½ pp.) Gives some details of the production, transmission and utilization of electric power generated by water in a district in North Wales. 20c.

3351—PUMP—The Starrett Air-lift Pump. (Eng. and Min. Journ., Mar. 30, 1907; 1½ pp.) Gives details of construction of this pump, with a lucid explanation of its theory of action. 20c.

3352—PUMPING PLANT—Electrically Driven Centrifugal Pumping Plant at the Tywarnhaile Mine. W. R. Thomas. (Instn. of Min. and Met., Bull. No. 30, Mar. 14, 1907; 17 pp.) Discussion and remarks by members of the Institution on the above paper, which was previously mentioned in the Index.

3353—SAFETY CATCH—The Schweder Safety Catch. K. Schweder. (So. Afr. Mines, Feb. 23, 1907; ½ p.) Describes briefly the construction and operation of this safety catch, in which carbonic acid gas is admitted into two cylinders, causing their pistons to be pushed out and into the guides in case of accident. 20c.

3353a—SAFETY CATCHES. (South African Mines, Mar. 30, 1907; 1 p.) Continuation of the discussion as to whether the breaking of the hoisting rope during upward travel of the cage can result in failure of safety devices to operate. 20c.

3354—VENTILATING FANS for Draft. Forced and Induced. I. C. L. Hubbard. (Power, May, 1907; 3½ pp.) Gives directions for calculating proportions and capacities of centrifugal fans, the horse-power required and the volume of air delivered. 20c.

3355—WINDING—Effects of Acceleration on Winding Torques, and Test of Tarbrax Electrical Winding-Plant. George Ness. (Trans. Min. Inst. of Scotland, Vol. XXIX, Part 3, 1907; 5 pp.) Discussion by members of the Institute of the above paper, which was previously mentioned in the Index.

3356—WINDING—Electrically-driven Winding Gear and the Supply of Power to Mines. A. H. Preece. (Coll. Guard., Apr. 5, 1907; ½ p.) Short abstract of paper read before the Brit. Instn. of Civl Engrs., Mar. 26, 1907. 40c.

3357—WINDING ENGINES—A Comparison of Steam and Electric Winding Engines. (Engineer, Lond., Apr. 5, 1907; 2 pp.) Gives several speed curves, indicator diagrams and plots of steam consumption and analyses the results indicated by them as regards the comparative efficiency of these two means of hoisting. 40c.

INDUSTRIAL CHEMISTRY

3358—AMALGAMS—The Electrolytic Preparation of Amalgams. G. McPh. Smith and J. R. Withrow. (Journ. Am. Chem. Soc., Mar. 1907; 3 pp.) Outlines the results of attempts to apply Shepherd's electrolytic method of making sodium amalgam to the manufacture of amalgams of other metals. 60c.

3359—ATMOSPHERIC NITROGEN—The Fixation of the Nitrogen of the Air and Application of the Products Obtained. O. Erlwein. (Electrician, Apr. 12, 1907; 1 p.) Abstract of lecture before the German Elektrotechnischer Verein, giving a general description of various successful methods for obtaining the nitrogen of the air in an active form, its utilisation in cyanamide and the application of these products. 40c.

3360—GLASS MANUFACTURE—La Fabrication Mécanique du Verre. E. Fourcault. (Rev. Univ. des Mines, Feb., 1907; 24 pp.) Describes the evolution of mechanical methods as applied to the manufacture of glass, with notes on furnaces and apparatus used in various systems of manufacture.

3361—NICKEL-ZINC ALLOYS—The Electrolytic Deposition of. E. P. Schoch and A. Hirsch. (Journ. Am. Chem. Soc., Mar., 1907; 7 pp.) Describes the apparatus used and the results secured in investigating the reasons why an electrolytic bath which contains more nickel than zinc yields an alloy which contains much more zinc than nickel. 60c.

ANALYTICAL CHEMISTRY

3362—ANTIMONY—Volumetric Estimation of Antimony. J. B. Duncan. (Chem. News, Feb. 1, 1907; 2 pp.) Gives the modifications of the volumetric method of antimony analysis proposed by Nissenson and Siedler as a result of which, it is possible to estimate quickly and accurately the amount of antimony in ores and slags. 40c.

3363—ASSAYING—Laboratory Crucible and Muffle Furnaces. G. T. Holloway. (Paper read before the Instn. of Min. and Met., Apr. 18, 1907; 8½ pp.) Gives drawings and descriptions of these furnaces which have been used successfully in the author's laboratory, with notes on methods of building and repairing them.

3364—BROMINE DETERMINATION—On the Direct Quantitative Separation of Chlorides and Bromides. L. W. Andrews. (Journ. Am. Chem. Soc., Mar., 1907; 8½ pp.) Gives a modification of Burgarszky's method of determining chlorine in the presence of bromine, whereby accuracy is secured when the relative percentage of chlorine is low. 60c.

3365—SPECTRUM ANALYSIS—Färben von Flammen für das analytische Praktikum. E. Beckmann. (Zeit. f. ange. Chem., Apr. 5, 1907; 3½ pp.) Describes various forms of improved apparatus for use in spectrum analysis and discusses new methods of producing colored flames which are free from some of the objections to the ordinary way of using a platinum wire dipped in the chloride solution of the metal. 40c.

3366—ZINC-LEAD PIGMENT—The Composition and Analysis of. E. W. Buskett. (Eng. and Min. Journ., Apr. 20, 1907; 1 p.) Gives procedure for determining various components of zinc and lead pigment, such as total zinc, zinc as sulphate, sulphur dioxide, etc. 20c.

MATERIALS OF CONSTRUCTION

3367—CONCRETE—Prevention of Freezing in Concrete by Calcium Chloride. R. K. Meade. (Eng. Rec., Apr. 20, 1907; 1½ pp.) Records the result of an extended investigation upon the properties of concrete when mixed with calcium chloride solutions which have a lower freezing point than water, due to the dissolved salt. 20c.

3368—CONCRETE—Some Representative Concrete mixing Plants with Records of Operating Costs. F. W. Daggett. (Engineering-Contracting, Apr. 17, 1907; 2½ pp.) Gives descriptions of typical concrete mixing plants which have come under the author's observation, with summaries of costs which embrace both costs of original installation and operating expenses. 20c.

3369—CONCRETE—The Laws of Proportioning Concrete. W. B. Fuller and S. E. Thompson. (Proc. A. S. C. E., Mar, 1907; 84 pp.) Records the result of a very complete investigation as to the influences which all the components of concrete have upon its strength with a view to determining the best proportions of ingredients, with reference also to the use of the concrete

3370—PORTLAND CEMENT—Die Wirkung der Soda auf die Abbindezeit des Portlandzementes. Rohland. (Tonind. Zeit., Mar. 16, 1907; 3½ pp.) Sums up the results of an inquiry as to the influence of soda upon the time required for portland cement to set. 20c.